FINAL

INSTALLATION RESTORATION PROGRAM

SITE INSPECTION REPORT
VOLUME II OF III

102nd AIR CONTROL SQUADRON
NORTH SMITHFIELD AIR NATIONAL GUARD STATION
SLATERSVILLE, RHODE ISLAND

SEPTEMBER 1995

Prepared For
AIR NATIONAL GUARD READINESS CENTER
ANDREWS AFB, MARYLAND 20331-6008

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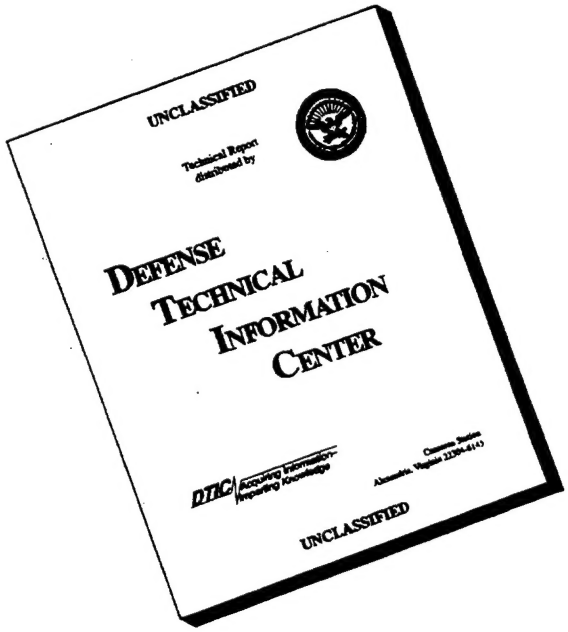

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Site Inspection Report, 102nd Air Control Squadron, North Smithfield Air National Guard Station, Slatersville, Rhode Island, Volume II of III. This is the second volume of a three volume site inspection report. Three areas of concern (AOCs) were investigated under the Installation Restoration Program. A passive soil gas survey was conducted of the entire station. Soil and groundwater samples were collected and analyzed. Low level contamination of fuel-related compounds were detected below state action levels. No further action was recommended.

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FINAL

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SITE INSPECTION REPORT

102nd AIR CONTROL SQUADRON
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SLATERSVILLE, RHODE ISLAND

SEPTEMBER 1995

Prepared For

AIR NATIONAL GUARD READINESS CENTER
ANDREWS AFB, MARYLAND 20331-6008

Prepared By

ANEPTEK CORPORATION
209 West Central Street
Natick, Massachusetts 01760

APPENDIX A

PASSIVE SOIL GAS SURVEY REPORT

Northeast Research Institute LLC

605 Parfet Street • Suite 100
Lakewood, Colorado 80215
303-238-0090 • 800-845-5137
Fax 303-238-2522

November 28, 1994

Mr. Mike Plumb
ANEPTEK Corporation
209 West Central Street
Natick, Massachusetts 01760

Phone: (508) 650-1048
Fax : (508) 651-1560

Dear Mr. Plumb:

Enclosed please find the draft report on the findings of the PETREX Soil Gas investigation performed at the North Smithfield ANGS Site located in SIatersville, Rhode Island.

If you have any questions concerning the enclosed, please do not hesitate to call either Mark Hatheway or myself. We will await your comments prior to issuing our final report.

Respectfully Submitted,
NORTHEAST RESEARCH INSTITUTE LLC

Julia Olney Gullett
Senior Geologist

encl
/JOG

D2185JG/11.28.94

Northeast Research Institute LLC

605 Parfet Street • Suite 100
Lakewood, Colorado 80215
303-238-0090 • 800-845-5137
Fax 303-238-2522

FINAL REPORT ON THE FINDINGS OF THE PETREX SOIL GAS SURVEY CONDUCTED FOR ANEPTEK CORPORATION

PREPARED BY: DATE:

Julia Olney Gullett, Senior Geologist — 11/28/94

APPROVED BY: DATE:

James H. Viellenave, Vice President — 11-28-94

NORTHEAST RESEARCH INSTITUTE
605 PARFET STREET, SUITE 100
LAKEWOOD, COLORADO 80215
(303) 238-0090

994-2195

TABLE OF CONTENTS

1.0 EXECUTIVE SUMMARY

Northeast Research Institute LLC (NERI) and ANEPTEK Corporation recently performed PETREX Soil Gas sampling at the Air National Guard Station (ANGS) in North Smithfield, Rhode Island. The purpose of the soil gas investigation was to screen the study area for the presence of benzene, toluene, ethylbenzene/xylene(s) (BTEX), trichloroethene (TCE), and trichloroethane (TCA) which may be indicative of chemical occurrences in the subsurface.

VOCs related to petroleum hydrocarbon mixtures such as gasoline, and Diesel/Fuel Oil fuel were identified in soil gas. Limited occurrences of the chlorinated solvents TCE and tetrachloroethene (PCE) were also detected. TCA was not identified in soil gas. The distributions of the gasoline and Diesel/Fuel Oil fuel mixtures were mapped by characterizing the hydrocarbon compounds detected and formulating soil gas signatures, or fingerprints, for each mixture. High soil gas response levels of hydrocarbons more likely related to gasoline (such as BTEX), were detected east of Building 110, north of Building 106 and in the vicinity of Buildings 107 and 111. The soil gas response levels detected in each of these areas may be indicative of potential source areas of gasoline release. High relative response levels for the Diesel/Fuel Oil like hydrocarbons (such as naphthalene) were detected in the vicinity of Building 109 and northwest of Building 106. The intermediate response levels for both mixtures indicate that primary migration of the hydrocarbons may have occurred following a north - south migration pathway. The hydrocarbon occurrences appear to extend beyond the survey boundaries primarily to the north, therefore the areal extent of the VOC occurrences was not defined by this investigation.

2.0 INTRODUCTION

Northeast Research Institute LLC (NERI) and ANEPTEK Corporation recently performed PETREX Soil Gas sampling at the Air National Guard Station (ANGS) in North Smithfield, Rhode Island. The purpose of the soil gas investigation was to screen the study area for the presence of benzene, toluene, ethylbenzene/xylene(s) (BTEX), trichloroethene (TCE), and trichloroethane (TCA) which may be indicative of chemical occurrences in the subsurface.

3.0 OVERVIEW OF THE PETREX TECHNIQUE

Each PETREX soil gas sampler consists of two or three activated charcoal adsorption elements (collectors) housed in a resealable glass container in an inert atmosphere.

Soil gas sample collection is performed by unsealing the sampler and exposing the collector to the soil gas of the subsurface environment at the base of a shallow borehole. Sample collection proceeds via free vapor diffusion through the opening of the uncapped sampler container. Following a controlled period of time, the sampler is retrieved from the borehole, resealed, and submitted for analysis.

One collector from each soil gas sampler is analyzed by Thermal Desorption/Mass Spectrometry (TD-MS). Selected second collectors may be analyzed by Thermal Desorption-Gas Chromatography/Mass Spectrometry (TD-GC/MS) for compound confirmation. At least ten percent of samplers used in any project are three collector samplers. The third collector is used for setting instrument sensitivity prior to analysis.

Compounds are identified by comparison to standard reference spectra run on the same instrument. The mass spectral ion count of the appropriate indicator peak(s) for each compound or group of compounds is then plotted as relative response on a map and contoured using a variety of standard geostatistical analyses.

For a more detailed and technical discussion of the method, please refer to Appendix A, PETREX Protocol.

4.0 OBJECTIVES

The purpose of the PETREX Soil Gas Survey was to:

1. Collect and report VOC's and SVOC's as constituents of soil gas;

2. Map the areal extent of the reported compounds in order to exhibit areas of potential subsurface contamination; and

3. Attempt to determine the extent of migration of the reported compounds in the subsurface.

5.0 SCOPE OF WORK

Eighty (80) PETREX soil gas samplers were utilized for this soil gas investigation. Samplers were place in a regular pattern throughout the site on one hundred (100) foot intervals. The survey was designed by ANEPTEK to screen potential source areas including the septic leach field located south of the primary study area.

6.0 FIELD ACTIVITIES

Sampler installation was performed between October 13th and 17th, 1994, sampler retrieval was performed on November 2nd and 3rd, 1994. Sampler installation and retrieval was performed by ANEPTEK personnel following one day of on-site training in the methods and protocols associated with performing a PETREX Soil Gas Survey.

Sampler exposure time was determined by the use of exposure time test samplers (time tests). Time test samplers were installed concurrently with the survey sampler installation and removed for analysis following a three (3) day exposure period. The purpose of the time test samplers was to assess the loading rate of Volatile Organic Compounds (VOCs) and Semi-Volatile Organic Compounds (SVOCs) onto the PETREX collectors. Based upon the analyses of time test samplers, 16 days was determined to be an optimum exposure period.

7.0 METHOD QA/QC

7.1 Lot Control

Quality assurance/quality control (QA/QC) collectors from each lot manufactured by NERI were analyzed by TD-MS to ensure that they were contaminant free before the lot of collectors used in the field was released from the PETREX laboratory. No compounds were detected above background on the QA/QC collectors.

7.2 Travel Blanks

Two PETREX samplers were provided as travel blanks. These travel blanks remained sealed and traveled with the survey samplers from the laboratory to the field and back to the laboratory to monitor for potential contamination of the survey samplers. The travel blanks were analyzed under the same instrument conditions as the survey collectors. The results of the analysis of the travel blanks are provided in Table 1, Appendix B.

A more detailed description of the PETREX QA/QC may be found in the PETREX Protocol located in Appendix A.

8.0 RESULTS

All samplers were analyzed by NERI's standard method of Thermal Desorption/Mass Spectrometry (TD-MS). The results of the analyses indicate that petroleum hydrocarbon mixtures related to both a gasoline and Diesel/Fuel Oil mixture were the most prominent compounds detected in soil gas. The distributions of the gasoline and Diesel/Fuel Oil fuel mixtures were mapped by characterizing the hydrocarbon compounds detected and formulating soil gas signatures, or fingerprints, for each mixture. In order to report the compounds identified, mass spectral peaks indicative of the compound mixtures were selected and their corresponding ion counts were summed. Table 2 lists the mass peaks (indicator peaks) which were used to represent the petroleum hydrocarbon mixtures reported in Table 1, Appendix B, and Plates 2-3, Appendix D.

TABLE 2
REPORTED COMPOUNDS AND THEIR INDICATOR MASS PEAKS (AMU)

Compound	Indicator peak
Gasoline Mixture	
C_6-C_{10} Aromatic Hydrocarbons	78, 92, 106, 120, 134
Diesel/Fuel Oil Mixture	
C_9-C_{14} Aliphatic Hydrocarbons	123, 137, 151, 165, 181, 195

In addition to the compounds reported above, limited occurrences of TCE and PCE were also identified. The locations and relative response of these occurrences are reported in Table 3, Appendix B.

Example mass spectra of the mixtures identified in this soil gas investigation are provided as Figures 1-4, Appendix C. A mass spectrum of a representative travel blank is shown in Figure 5.

9.0 DISCUSSION

The soil gas response levels discussed in the following section are described as high and intermediate relative to the entire data set. The ion count values that have been reported represent qualitative soil gas values that were evaluated relative to the other sampler locations.

The response values are reported in ion counts. Ion count values are the unit of measure assigned by the mass spectrometer to the relative intensities associated with each of the reported compounds. These intensity levels or response levels do not represent an actual concentration of the reported compounds; however, they are best utilized as a qualitative measurement. A difference in ion count values of an order of magnitude or more is considered

significant when interpreting potential source areas and migration/dispersion pathways versus background areas.

The contour intervals depicted on Plates 2-3 were determined using histograms formulated from the statistical distribution of the data set. The histograms used to determine the sample population breaks are provided as Figures 1-2, Appendix D.

For a complete discussion of relative response map evaluation, please refer to the PETREX Protocol, Appendix A.

9.1 The Distribution of The Gasoline Mixture

The distribution of the Gasoline Mixture is shown on Plate 2, Appendix E. High soil gas response levels of the gasoline range hydrocarbons were detected in the vicinity of Building 110, north of Building 106 and in the vicinity of Buildings 107 and 111. The soil gas response levels detected in each of these areas may be indicative of potential source areas of gasoline release. Several spatially continuous samples exhibiting high response levels were detected east of Building 110 in a north - south trending pattern. The responses detected in this area may indicate a primary potential source in this area. Intermediate response levels, which generally depict migration patterns, for the gasoline mixture were detected throughout the central portion of the study area, and also appear to follow a north-south migration pathway. The intermediate response levels detected in the vicinity of Building 106 indicate that migration is limited to this vicinity. The intermediate response levels detected in the vicinity of Building 111 indicate that migration may have occurred towards the northeast. Isolated occurrences of intermediate response were also identified in the vicinity of Buildings 104 and 105, west of Building 108 and at a single location in the leach field. The environmental significance of these apparently separate occurrences is difficult to ascertain, however the response levels detected at these locations are not those generally indicative of potential source areas. The distribution of the gasoline mixture extends beyond the survey boundaries to the north, east and potentially to the west and was not defined.

The identification of the aromatic hydrocarbons was not possible at several sample locations due to interference associated with terpenes. Terpenes are naturally existing vegetative compounds sourced predominantly from pine trees, whose mass fall within the same mass range as several petroleum hydrocarbons. The samples in which interference by terpenes masked the identification of the gasoline range hydrocarbons have been denoted by a "T" on Tables 1, Appendix B, and Plate 2, Appendix E.

9.2 The Distribution of The Diesel/Fuel Oil Mixture

High relative response levels for the Diesel/Fuel Oil hydrocarbons were detected in the vicinity of Building 109, northwest of Building 106 and at a single location southeast of Building 110. The intermediate response levels detected indicate a north-south preferential migration pathway.

Isolated occurrences of the diesel/fuel oil mixture were also detected east and southeast of Building 104, and east of Building 111.

10.0 CONCLUSIONS

VOCs related to gasoline and diesel/fuel oil petroleum hydrocarbon mixtures were detected in soil gas at this site. In addition limited occurrences of TCE and PCE were detected. The distributions of the hydrocarbon mixtures were mapped and potential source areas were identified. The primary potential source area of gasoline release appears to have been identified in the vicinity located east of Building 110. The primary potential source area of diesel/fuel oil release appears to have been identified in the are located west of Building 109. A preferential migration pattern trending north-south appears to exist for both compound mixtures. The areal extent of hydrocarbon occurrences extends beyond the survey boundaries, and was not defined by this investigation.

The distribution of the compounds which comprise the diesel/fuel oil soil gas mixture is less extensive than that of the aromatic compounds which define the gasoline mixture. The aliphatic compounds are much less mobile in the subsurface due to their chemical structure and lower mobility. Conversely the higher solubility and mobility of the aromatic compounds tend to illustrate the extents of chemical migration.

Because soil gas emanation rates are site and chemical specific, the environmental significance of the soil gas response values must be determined relative to compound concentrations in subsurface soil and/or groundwater. Changes in soil gas response in orders of magnitude may be used to plan future investigative studies, and to aid in characterizing the behavior (migration, attenuation) of the chemicals in the subsurface. The PETREX method is extremely sensitive and often detects compounds in the low part per billion (ppb) range; therefore areas depicted as background by the PETREX method generally do not represent environmentally significant contaminant levels in the subsurface.

11.0 RECOMMENDATIONS

Based upon the findings of the PETREX soil gas survey, NERI recommends:

1. Performing an extended PETREX soil gas survey in directions in which chemical occurrences appear to extend beyond the limits of this investigation. The data obtained from this follow up investigation can be used to determine additional potential source areas and define the areal extent of migration.

2. Perform subsurface profiling in the vicinity of sample locations 21, 24, 25, 30, 33, 36, 41, 45, 48, 53, 60 and 62. Soil and groundwater analyses should include methods which detect aromatic and aliphatic hydrocarbons as well as chlorinated hydrocarbons.

12.0 LIMITATIONS

This report represents NERI's professional interpretation and judgment based on technical information gathered during investigative activities. Professional judgments expressed herein are restricted to facts available within the established limits of the scope of work, budget, and schedule. NERI assumes no responsibility for the existence or disclosure of conditions which did not come to its knowledge, or conditions not generally recognized as environmentally unacceptable, at the time this report was prepared.

It is NERI's specific intent that all observations and conclusions presented will be used as a guide and not necessarily a firm course of action unless explicitly stated as such. No warranties are expressed or implied and the information included in this report is not to be construed as legal advice.

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APPENDIX A
PETREX Protocol

REVISED SEPTEMBER 1993

PETREX ENVIRONMENTAL SOIL GAS PROTOCOL

INTRODUCTION

The PETREX Technique provides a means by which trace quantities of gases from subsurface derived organic contaminants can be detected and collected at the earth's surface. The Technique is integrative, thereby eliminating the short-term variations associated with other gas/vapor detection methods. The PETREX Technique directly collects and records a broad range of organic compounds emanating from subsurface sources.

SOIL GAS COLLECTOR PREPARATION

Adsorption collector wires (after construction) are cleaned by heating to 358° C in a high vacuum system. Wires are packed under an inert atmosphere in glass culture tubes. One collector out of every batch of thirty is checked for cleanliness by mass spectrometry. Another collector from the batch is checked for adsorptive capability. Based on the results, the batch of collectors is approved for release into the field.

SOIL GAS SAMPLER INSTALLATION

The sampler consists of two or three collectors, each a ferromagnetic wire coated with an activated charcoal adsorbent in a screw top glass culture tube. Each sampler is typically placed in a shallow hole, 14-18 inches deep. The hole is backfilled and the location is marked. The sampler is left in the ground from one to thirty days, then retrieved and sealed for transportation back to the laboratory for analysis.

The PETREX soil gas sampling technique is adaptable to various surface conditions commonly encountered within survey areas. These surfaces typically include concrete, asphalt, grass, and gravel. Two installation methods are routinely utilized to adapt to these surface conditions.

The first method utilizes a coring shovel for sampler installations in grass or otherwise loosely consolidated soil conditions. The shovel cores a 14 inch deep by 2 inch diameter hole in the surface soils.

PETREX soil gas samplers are placed (open end down) at the bottom of each core hole. The samplers are then backfilled with an aluminum foil plug and the original excavated soil. To complete installation, sample locations are marked with ribbon flagging and a numbered pin flag, as well as entered into a field notebook and plotted on a field map.

The second method of sampler installation utilizes an electric rotary hammer, equipped with an 18 inch by 1.5 inch diameter drill bit, for sampler installations under concrete, asphalt, or otherwise consolidated conditions. A hole is drilled through the surface to the dimensions of the drill bit equipped to the rotary hammer.

PETREX soil gas samplers are placed at the bottom of each drilled hole. For retrieval purposes, a cleaned galvanized steel wire is attached to each sampler. Aluminum foil is used to plug each hole to approximately two inches below grade. Then each hole is capped to grade with hydraulic cement. The hydraulic cement serves as protection from the external surface environment.

To complete sampler installation, sampler locations are marked with paint (where applicable), entered into a field notebook, and plotted on a field map.

SOIL GAS SAMPLER RETRIEVAL

PETREX soil gas samplers are retrieved following a time period that has allowed for the soil gas emanating from the subsurface environment of a survey area to equilibrate with the installed PETREX samplers. This time integration period is determined for each PETREX soil gas survey based on time calibration data or site conditions.

Retrieval operations are dependent on surface conditions and routinely consist of the following two methods.

The first method applies to grass covered or loosely consolidated soil conditions. A trowel is utilized to expose the backfilled samplers; then with a pair of tongs, the samplers are brought to the surface. At the surface, the samplers are sealed, cleaned, and labeled. Following retrieval, all debris are gathered and the core hole is backfilled with original material.

The second method applies to concrete, asphalt, or other consolidated surface conditions. A hammer and chisel is utilized to remove the hydraulic cement plug and expose the sampler. By means of the pre-attached retrieval wire, the sampler is brought to the surface. At the surface, the retrieval wire is removed and the sampler is sealed, cleaned, and labeled. Following retrieval, each drill hole is backfilled and patched with cement or asphalt.

TIME CALIBRATION SAMPLERS

Time calibration samplers are included in PETREX soil gas surveys, as appropriate. These samplers are included as a means of monitoring the loading rates of volatile and semivolatile organic compounds (VOCs and SVOCs) emanating from the soil gas at a survey area onto the PETREX collectors.

During PETREX sampler installation, two sets of three to five time calibration samplers are also installed at survey sample locations that best represent the range of soil gas response for the survey area. These representative locations are determined based on previous soils and/or groundwater studies and other site specific conditions such as gradient and potential source areas.

The first set of time calibration samplers are generally retrieved within a week or less following the initial installation and the second set one week later. Often, permanent on-site personnel are instructed to perform time calibration sampler retrieval.

Lengths of exposure periods of the survey samplers for each survey are determined based on the results of each respective set of time calibration samplers. Time calibration samplers are usually analyzed within 24 hours upon receipt at the laboratory. At the first indication of significant relative ion count intensities and significant total ion count values, the decision is made to retrieve the entire complement of survey samplers.

If there are no significant relative ion count intensities detected from the second set of time calibration samplers, then the survey samplers are allowed to equilibrate in the field for a maximum time period of up to 30 days. The average environmental PETREX soil gas survey requires a collector integration period of one day to two weeks.

METHOD QA/QC

Within every survey sampler, the two or three collector wires should have adsorbed identical compounds. Like compounds on separate collectors relate an acceptable quality assurance (QA) during the survey's analysis. The first wire is analyzed by Thermal Desorption/Mass Spectrometry (TD/MS). The data from the first wire is reported on the relative response maps. The second wire is retained for analysis by Thermal Desorption-Gas Chromatography/Mass Spectrometry (TD-GC/MS), if warranted by the initial TD/MS analysis of the second wire.

Approximately ten percent of the total PETREX survey samplers contain three collector wires. The third collector wire, a QC collector wire, is used by the operator to test the mass spectrometer's operating conditions prior to survey analysis. Some of these quality control (QC) collectors are also used to check the mass spectrometer sensitivity during survey analysis. In addition, the QC collector may be used to compare the reproducibility of the detected VOCs.

TRAVEL BLANKS

Two PETREX samplers, each containing a single collector wire, are included with each PETREX soil gas survey as travel blanks. These blanks are analyzed with the survey samplers to indicate whether there may have been contamination introduced to the survey samplers during installation or shipment. If compounds other than normal atmospherics (e.g., CO_2, H_20, N_2, and Ar) are detected on the blanks, these results are taken into consideration in the data presentation. This process, an initial step to data interpretation, involves the correction of ion count values of the detected blank contaminants from the entire survey's data set. The resulting ion count values are provided on the relative response maps.

MASS SPECTROMETER TUNING

An Extranuclear Quadrupole C-50 Mass Spectrometer or similar instrument, equipped with a Curie-point pyrolysis/thermal desorption inlet, is used for collector analysis. Mass assignment and resolution are manually adjusted using a Perfluorotributylamine (PFTBA) standard or a built-in tuning program, depending on the instrument. A linear correction, based on the known spectrum of PFTBA, is calculated. This correction is applied to a second PFTBA spectrum. If correct mass (M/Z) values are obtained, the operator proceeds to the next tuning step. If not, Step 1 is repeated until correct masses are obtained.

Peak intensity ratios are set from the major peaks in the PFTBA spectrum using the following values:

Mass (M/Z)		Spectrum Intensities
69	=	100%
131	=	48% ± 5%
219	=	50% ± 5%

During tuning, the ion signal for mass (M/Z) 69 of PFTBA is measured at a preset sample pressure and detector voltage and compared to previous values at the same setting.

Electron energy is set to 70 electron volts. All other operating parameters, such as scans, scan range, and mass offset, are established in the computer program. These values may only be changed by the laboratory manager.

Tuning is performed at the beginning of a run so that an individual survey is analyzed at the same set of instrument conditions. The samplers are analyzed in random order.

LABORATORY ANALYSIS

Periodic machine background and blank PETREX collector analyses are performed to assure that there is no carry-over between successive collectors. If there are peaks present which are not related to atmospheric gases, the supervisor is notified and the mass spectrometer is shut down and cleaned as necessary.

A written sample number record is kept during the analysis to prevent accidental cross numbering. The mass spectrometer control program contains appropriate "flag statements" that prompt the operator with a warning if an input sample number has already been analyzed. The operator then checks the current number, along with the disk storage location of the previously entered number to identify the true numbering situation.

COMPOUND IDENTIFICATION

Compound identification is based on molecular weight, compound fragmentation, and isotope distribution, as applicable. Each VOC exhibits a unique mass spectral signature. NERI maintains a large library of spectra of individual compounds, accessible by computer. In addition, the company maintains a large library of mass spectra of commonly used chemical mixtures; e.g., gasolines, diesels, industrial oils and solvents, coatings, plastics, etc. These spectra are used to assist in both compound and mixture identifications.

The ion count response of an indicator peak(s), representative of the compound and away from interference by other compounds, is extracted for data presentation and mapping.

INTERPRETATION OF SOIL GAS DATA

Soil gas data (including PETREX) reflect volatile and semivolatile organics collected at a point in the near surface. The sources of these volatile organics may be in the stratigraphic column and/or in groundwater below the collection point. Thus, the organics can be derived from surface spills, deposition, or migration into the deeper vadose zone, and groundwater. The soil gas survey reveals the areal extent of contamination and is the optimum guide in identifying areas in order to develop a vertical profile, including the drilling of soil borings and monitoring wells.

Soil gas data are always semi-quantitative in that multiple sources in soil and/or groundwater cannot be differentiated. However, the higher ion responses are representative of higher concentrations in the subsurface, given that geologic conditions are relatively consistent.

Due to chemical differences between individual compounds, including their ability to both adsorb and desorb from the charcoal PETREX collector element, it is invalid to compare the ion count of a compound at one sampling location to that of another compound.

APPENDIX B
Tables 1 and 3

Table 1

PETREX Relative Soil Gas Response Values

(in ion counts)

North Smithfield ANGS, Slatersville, RI

ANEPTEK Corporation

Sample Number	Gasoline	Diesel/Fuel Oil
1	24,564	ND
2	1,375	ND
3	1,430	ND
4	19,912	ND
5	110,879	ND
6	619	ND
7	57,588	ND
8	T	ND
9	ND	ND
10	133,322	ND
11	218,077	ND
12	91,825	ND
13	29,778	ND
14	ND	ND
15	10,129	ND
16	61,984	ND
17	43,473	ND
18	2,819	ND
19	21,151	ND
20	63,030	ND
21	5,817,152	136,764
22	535,800	42,911
23	128,554	ND
24	114,050	ND
25	2,417,029	628,655
26	675,452	90,690
27	885,217	842,216
28	868,758	190,967
29	50,621	ND
30	1,719,666	9,443,452
31	97,784	84,455
32	68,126	ND
33	2,685,389	362,559
34	117,450	ND
35	987,799	43,149

Table 1

PETREX Relative Soil Gas Response Values

(in ion counts)

North Smithfield ANGS, Slatersville, RI

ANEPTEK Corporation

Sample Number	Gasoline	Diesel/Fuel Oil
36	269,056	11,731
37	221,462	8,731
38	T	ND
39	90,507	ND
40	91,196	ND
41	7,190,290	3,117,008
42	329,328	1,151,093
43	402,774	70,630
44	817,531	536,098
45	3,883,497	284,293
46	165,474	ND
47	24,776	1,383
48	2,582,176	168,418
49	635,737	112,997
50	90,223	27,943
51	13,206	6,617
52	45,872	1,397
53	1,437,331	33,130
54	159,397	10,473
55	T	ND
56	T	ND
57	T	ND
58	T	ND
59	703,406	ND
60	3,667,199	10,696,322
61	316,573	ND
62	1,856,655	4,996
63	1,166,522	ND
64	2,398,249	ND
65	T	ND
66	T	ND
67	8,113,850	14,793,612
68	T	ND
69	2,630	ND
70	T	ND
71	T	ND

Table 1

PETREX Relative Soil Gas Response Values

(in ion counts)

North Smithfield ANGS, Slatersville, RI

ANEPTEK Corporation

Sample Number	Gasoline	Diesel/Fuel Oil	
72	T	ND	
73	10,043	ND	
74	14,758	ND	
75	44,733	ND	
76	22,041	ND	
77	3,042	ND	
78	ND	ND	
79	ND	ND	
80	3,388	ND	
900	ND	ND	Travel Blank
901	ND	ND	Travel Blank

Notes:

1. The C6-C10 aromatics were summed to represent gasoline.
2. The C9-C14 aliphatic hydrocarbons were summed to represent diesel/fuel oil.
3. ND = Not Detected
4. The presence of naturally occurring aromatic terpenes, a class of compounds generated by vegetation, masked the identification of gasoline aromatics. However, review of the mass spectra suggests that there were no other hydrocarbons present that would indicate the presence of gasoline.

Table 3

Additional Compounds Detected in Soil Gas
North Smithfield ANGS, Slatersville, RI
ANEPTEK Corporation

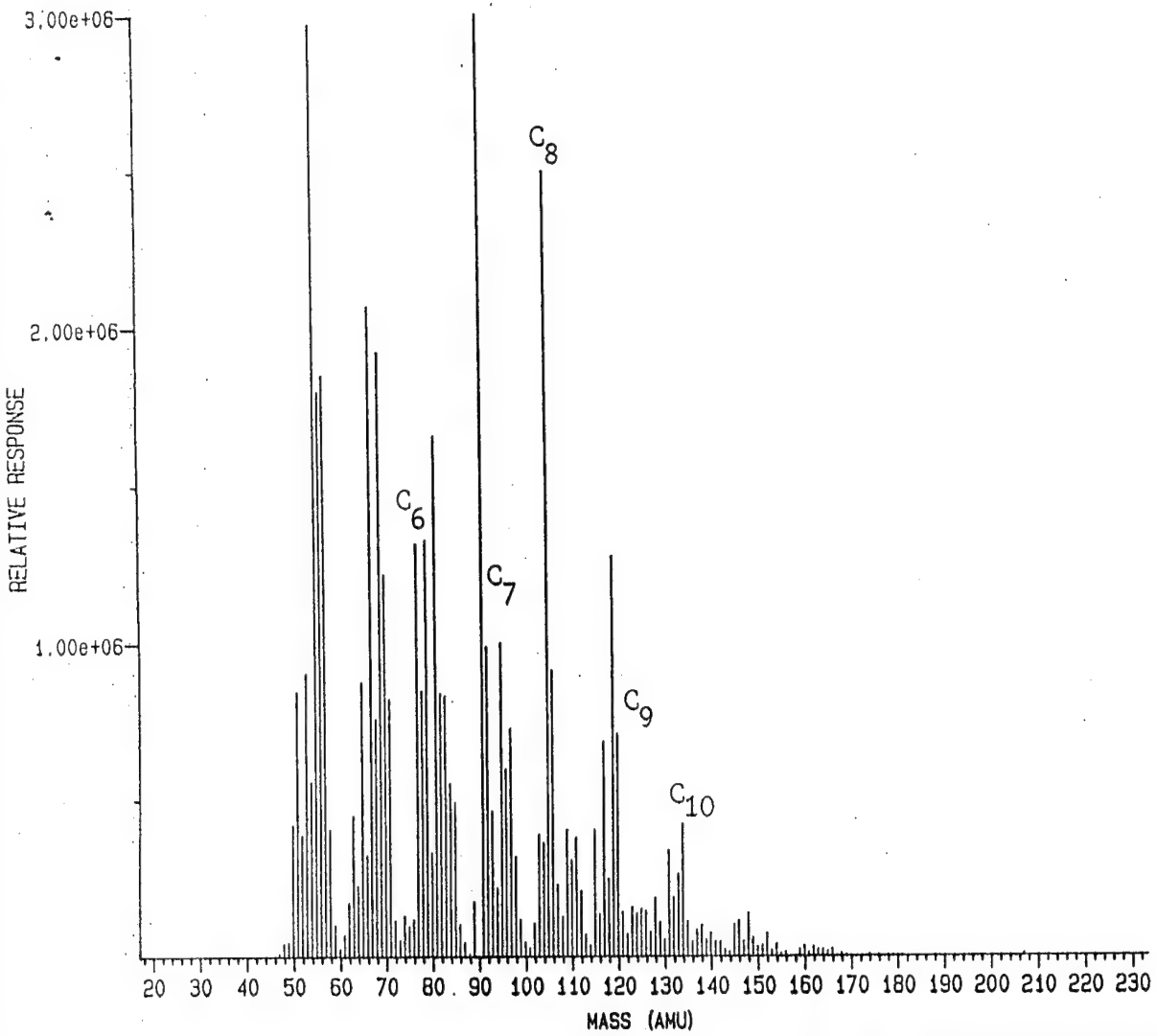
Compound	Sample Location	Relative Response (in ion counts)
TCE	24	318,638
	74	24,632
PCE	15	16,238
	24	26,214
	36	491,484
	37	80,379

TCE - Trichloroethene
Indicator Mass Peak(s) 130

PCE - Tetrachloroethene
Indicator Mass Peak(s) 164

APPENDIX C
Sample Mass Spectra of Compounds Identified

Figure 1
Sample Spectra for Gasoline Mixture



C_6-C_{10} Aromatic Hydrocarbons

Sample: 0045

NERI, LLC

Figure 2
Sample Spectra for Fuel Oil

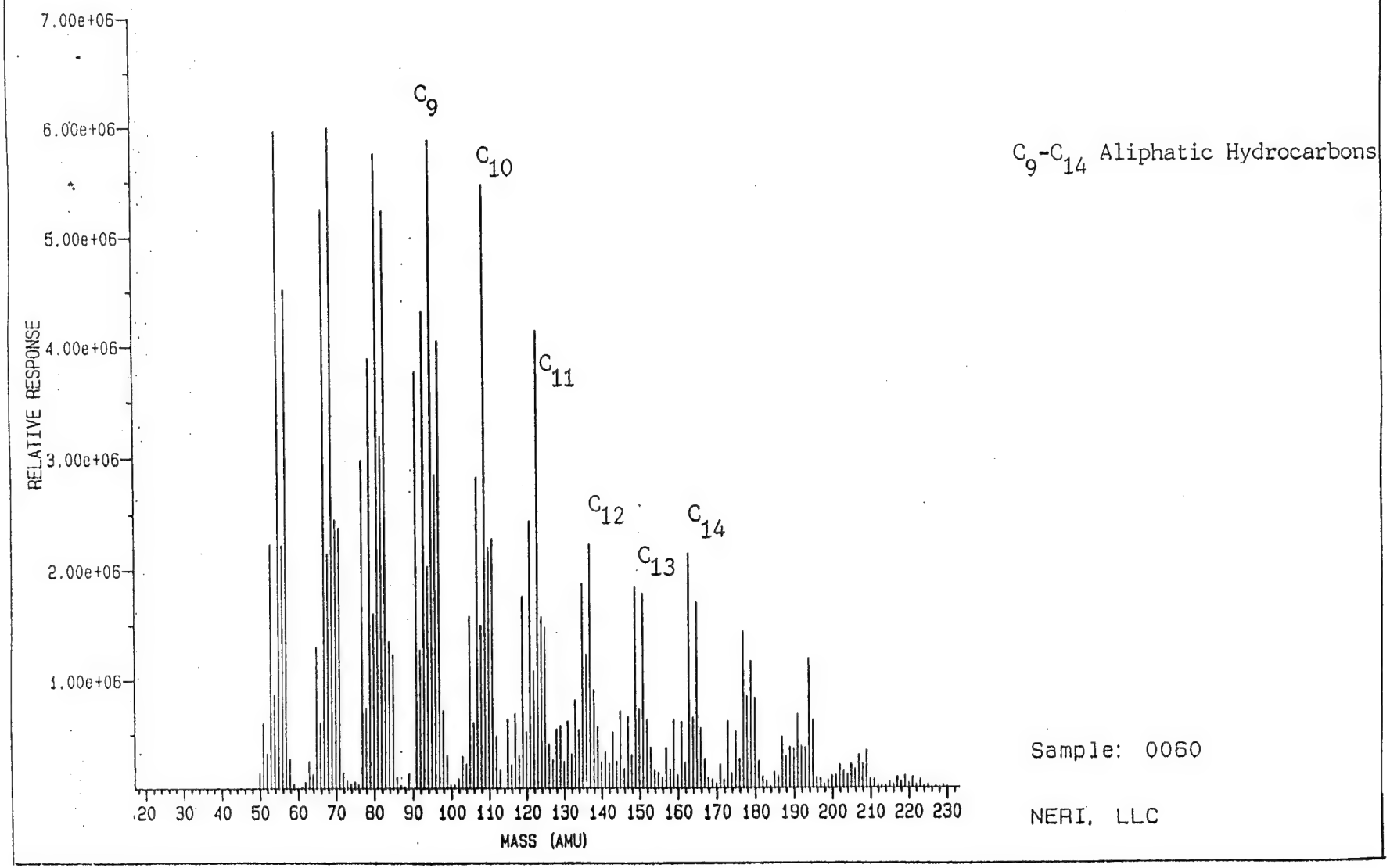


Figure 3
Sample Spectra for TCE

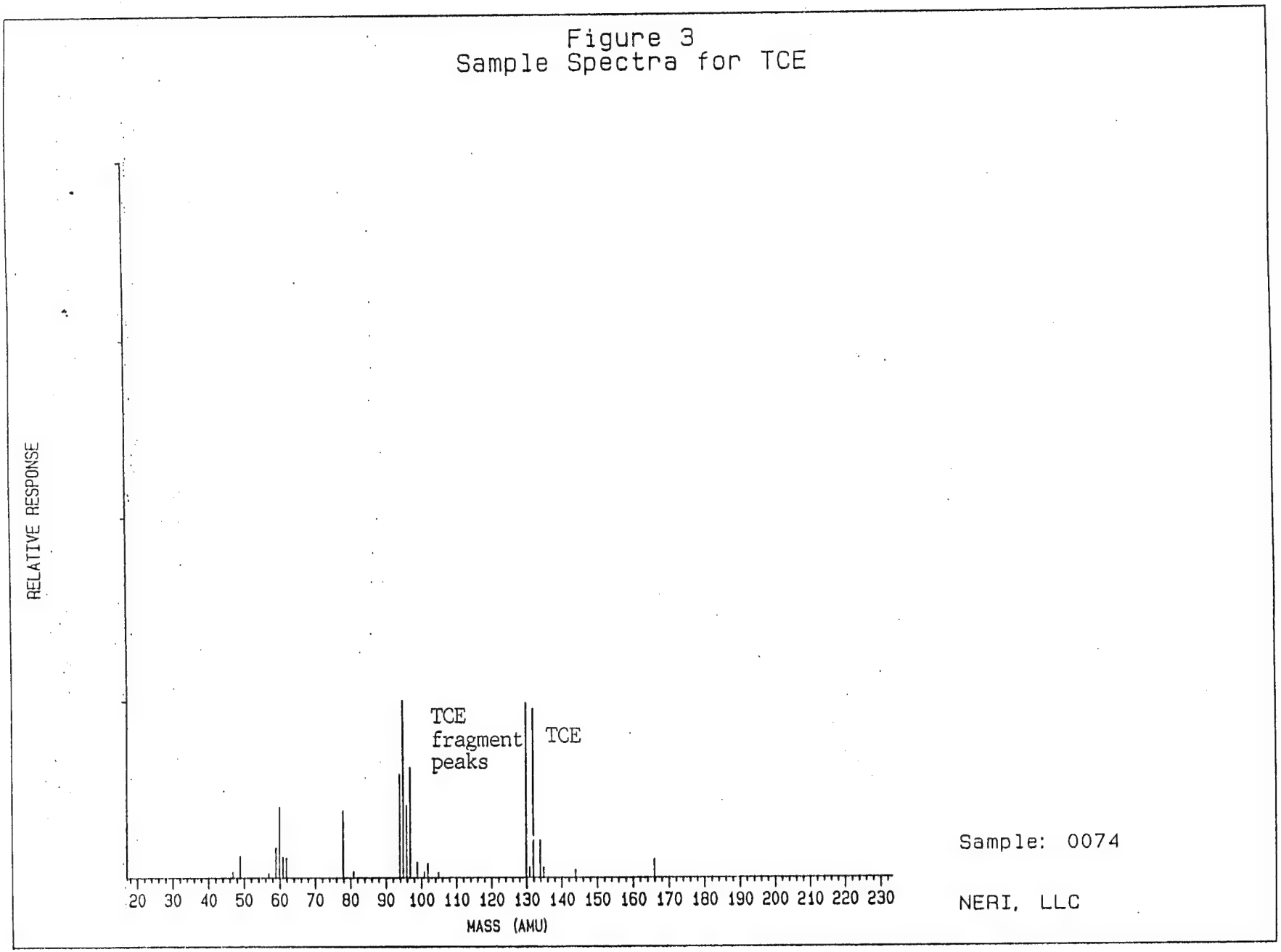


Figure 4
Sample Spectra for PCE

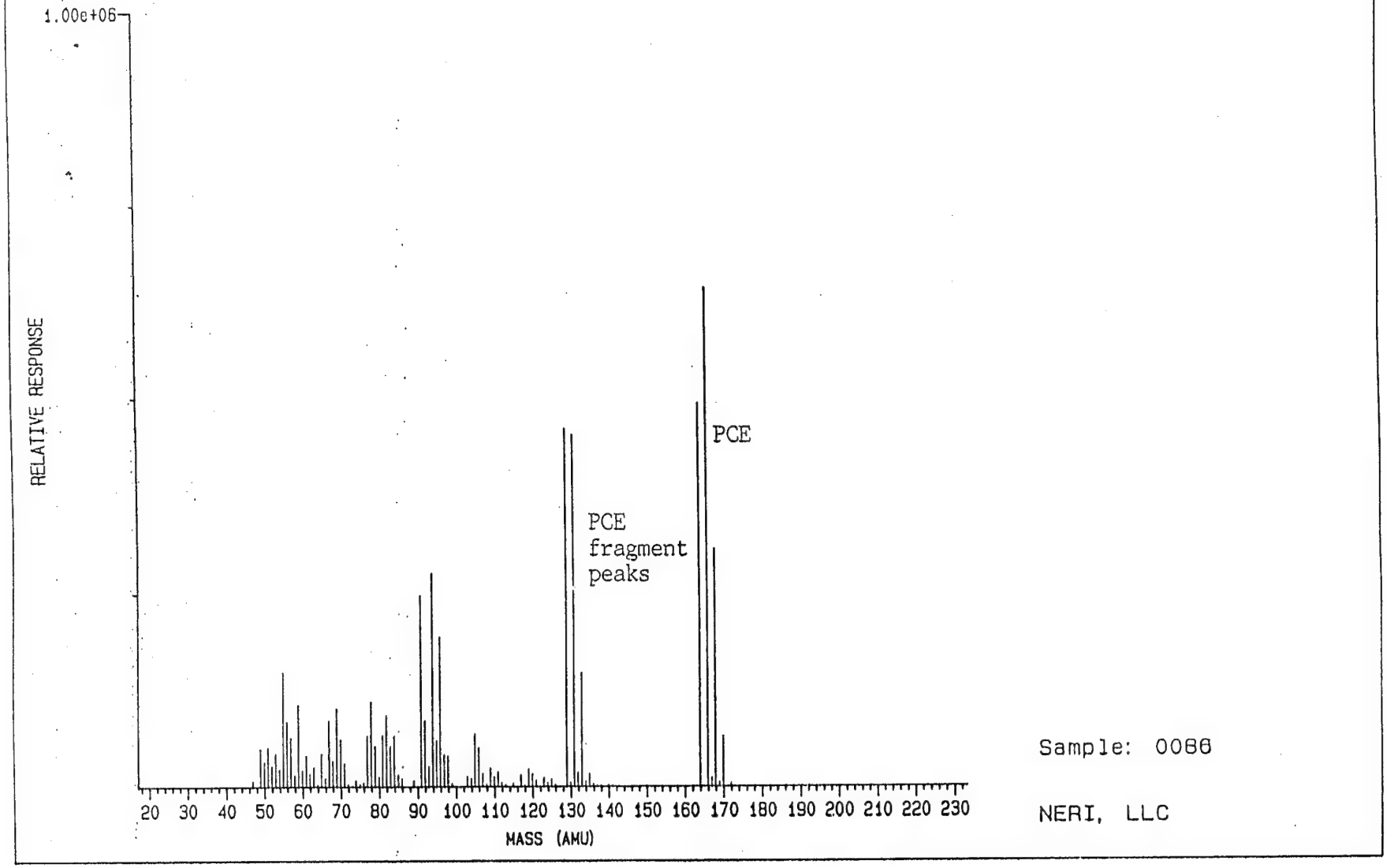
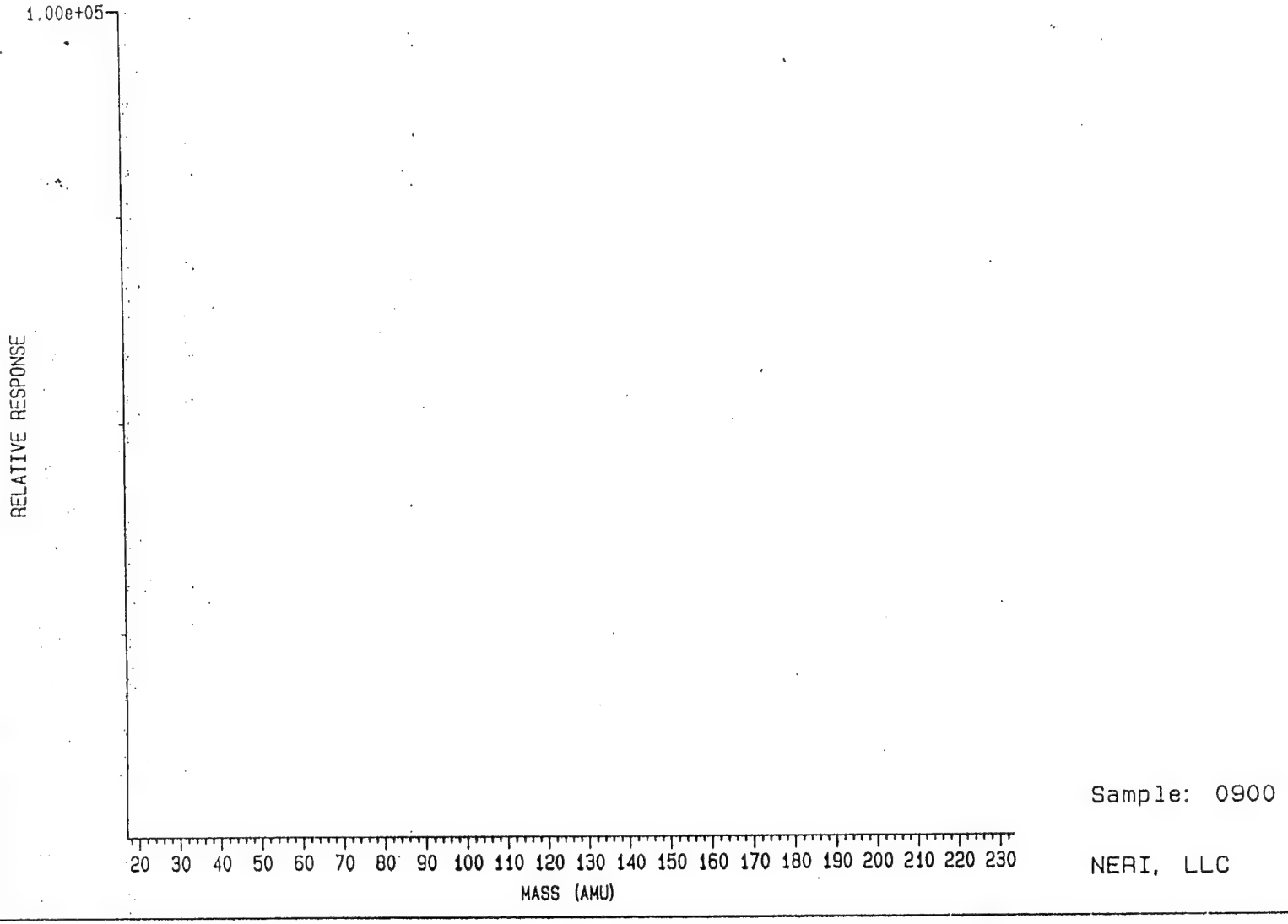
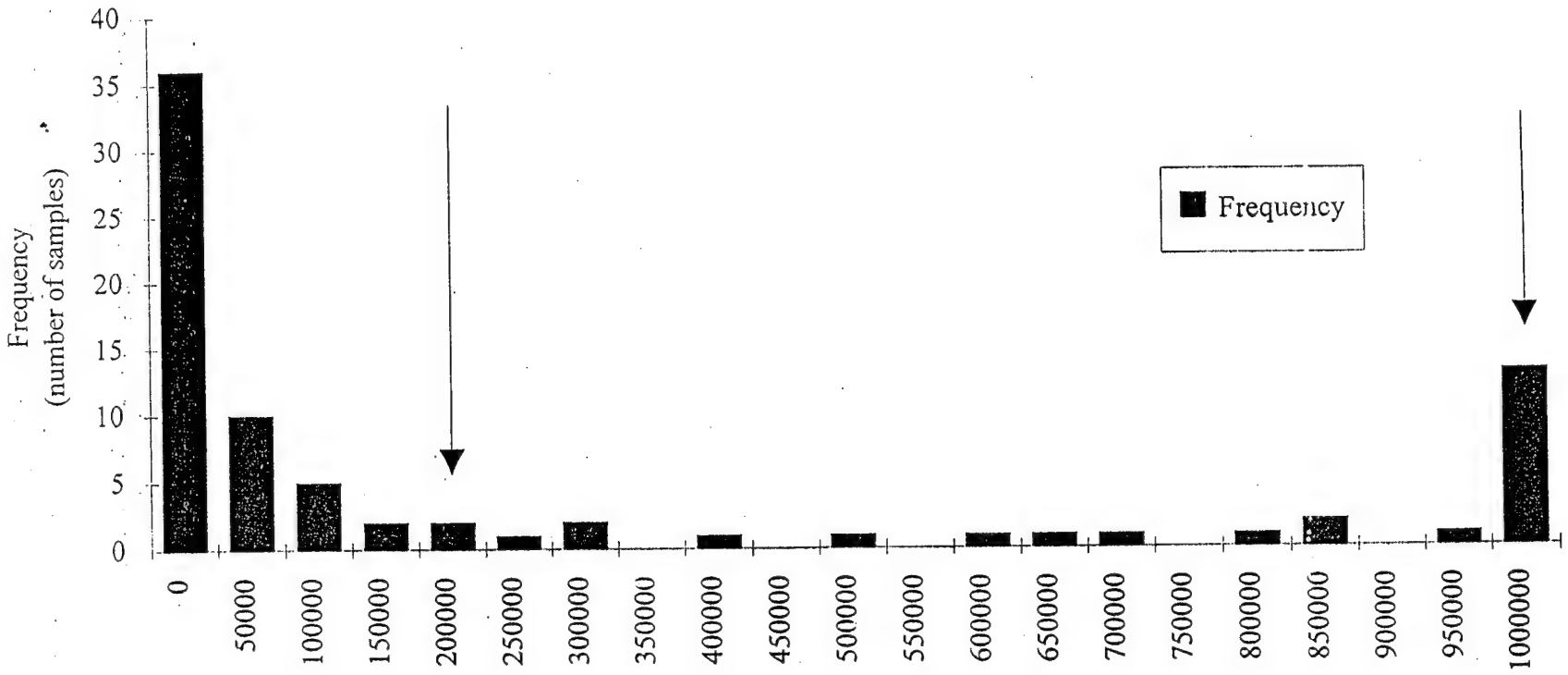


Figure 5
Sample Spectra for QA/QC Travel Blank Sample



APPENDIX D
Histograms Used to Determine Contour Intervals

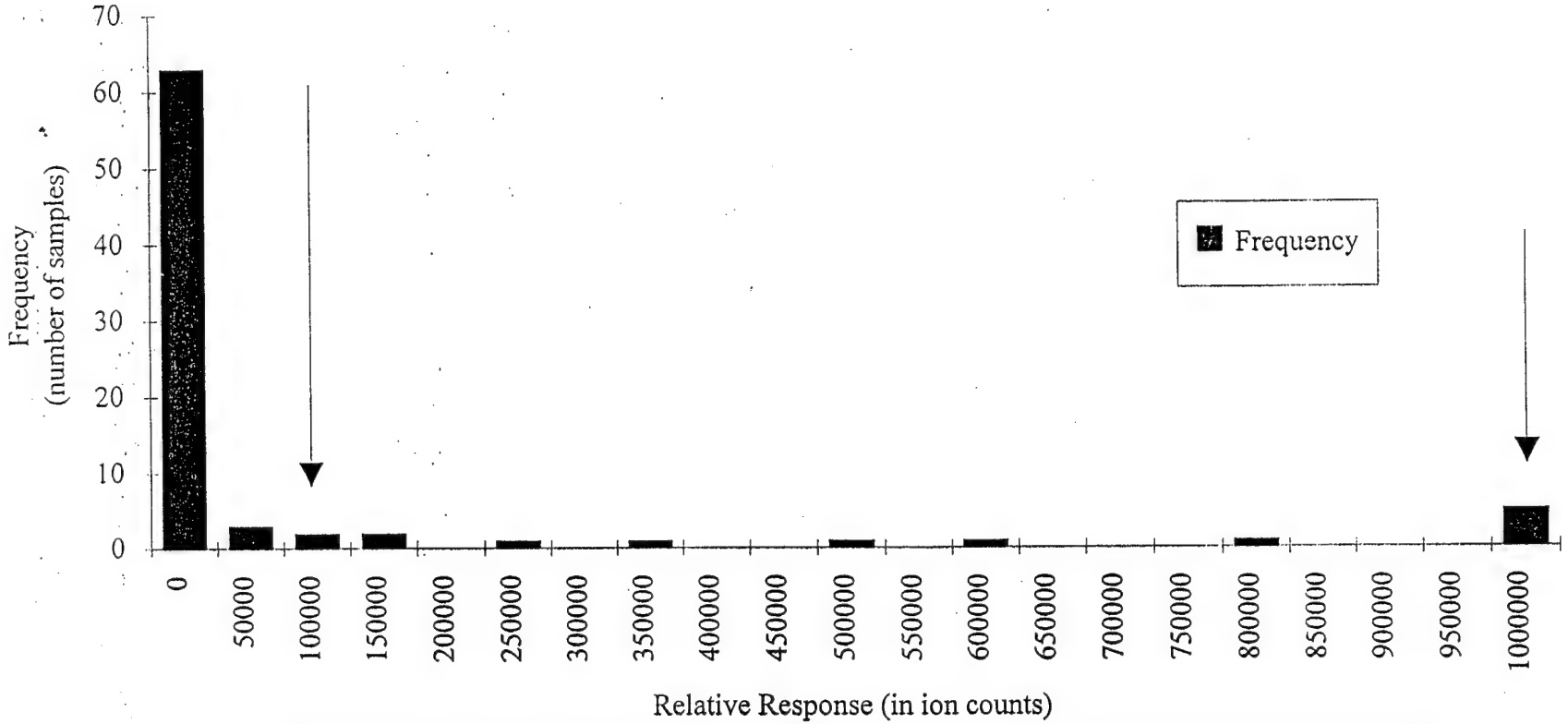
Figure 1
Gasoline Mixture Histogram



Arrows indicate sample population breaks used to establish contour intervals depicted on Plate 2.

2185gas.his

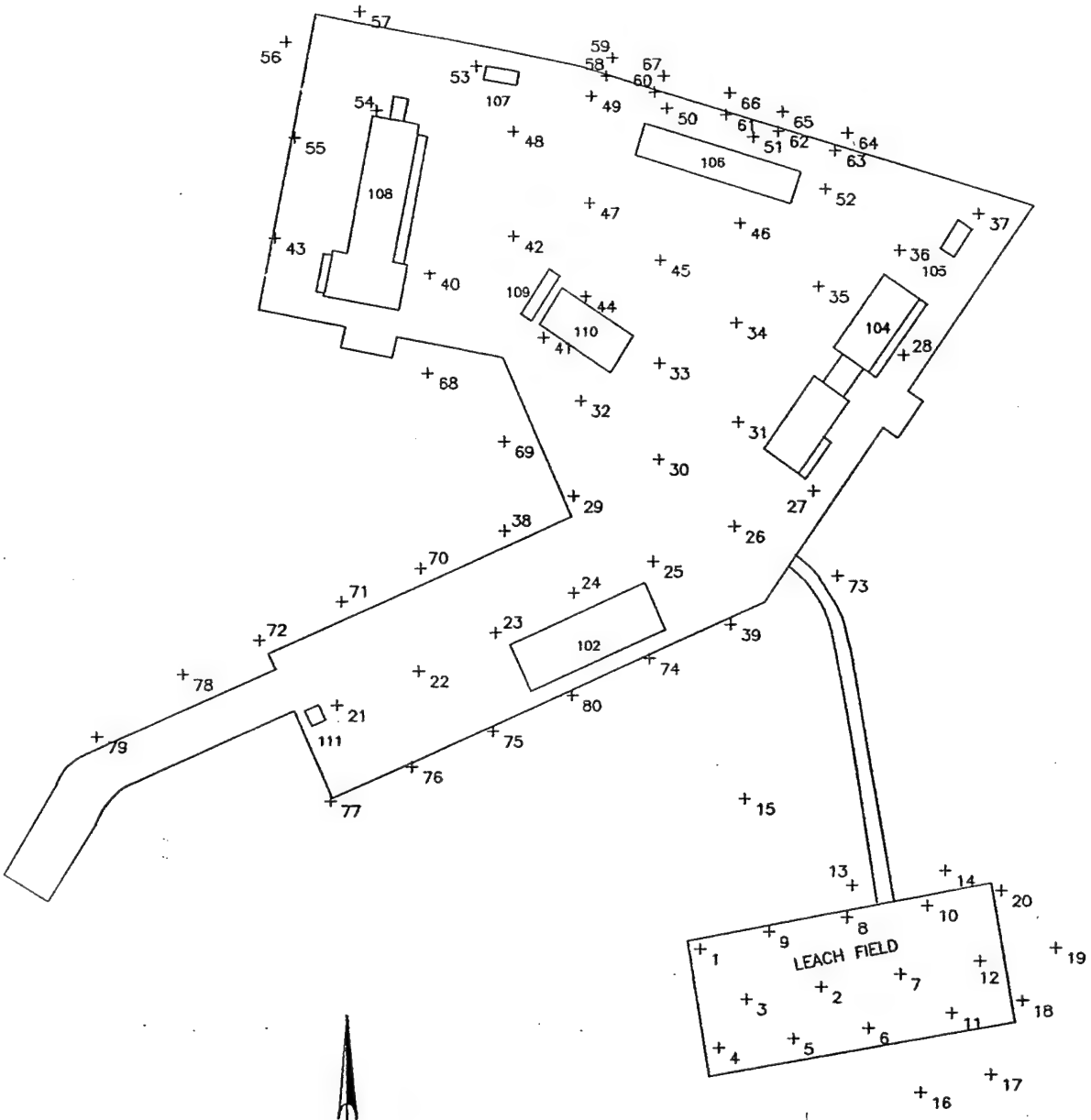
Figure 2
Diesel/Fuel Oil Histogram



Arrows indicate sample population breaks used to establish contour intervals depicted on Plate 3.

2185dies.his

APPENDIX E
Plates 1 - 3



0 100' 200' 300'

APPROXIMATE SCALE

SOURCE: PRELIMINARY ASSESSMENT, JUNE 1993

LEGEND
Features:
+ PETREX Sample Location

Northeast Research Institute LLC
595 Parfet Street
Suite 100
Lakewood, Colorado 80215
(303) 238-0090

Drawn By:	Project #:
JCS	2185E
Checked By:	Date:
	November 22, 1994
Project Manager:	File Name:
JOG	2185-1.dwg

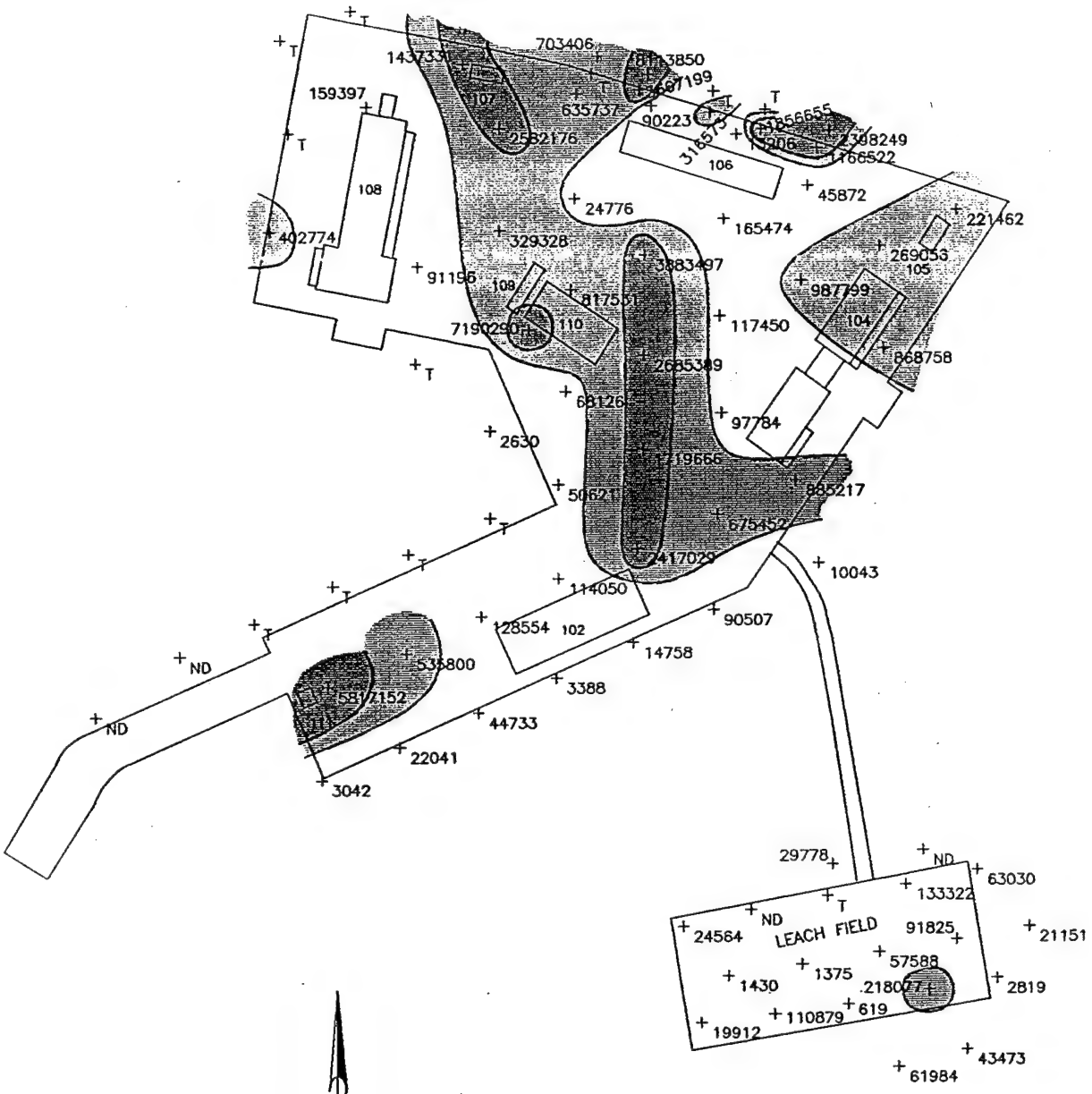
Aneptek Corporation

North Smithfield ANGS
102ND Air Control Squadron
Slatersville, Rhode Island

PETREX FINGERPRINT TECHNOLOGY®

Sample Locations

Plate 1



0 100' 200' 300'

APPROXIMATE SCALE

SOURCE: PRELIMINARY ASSESSMENT, JUNE 1993

LEGEND	
Relative Response Values: ≥ 1,000,000; 200,000 – 999,999	Features: + PETREX Sample Location; T Compound identification not possible due to interference associated with terpene compounds.; ND Not Detected

Northeast Research Institute LLC
605 Parfet Street
Suite 100
Lakewood, Colorado 80215
(303) 238-0090

Drawn By:	Project #:
JCS	2185E
Checked By:	Date:
	November 22, 1994
Project Manager:	File Name:
JOG	2185-2.dwg

Aneptek Corporation

North Smithfield ANGS

102ND Air Control Squadron

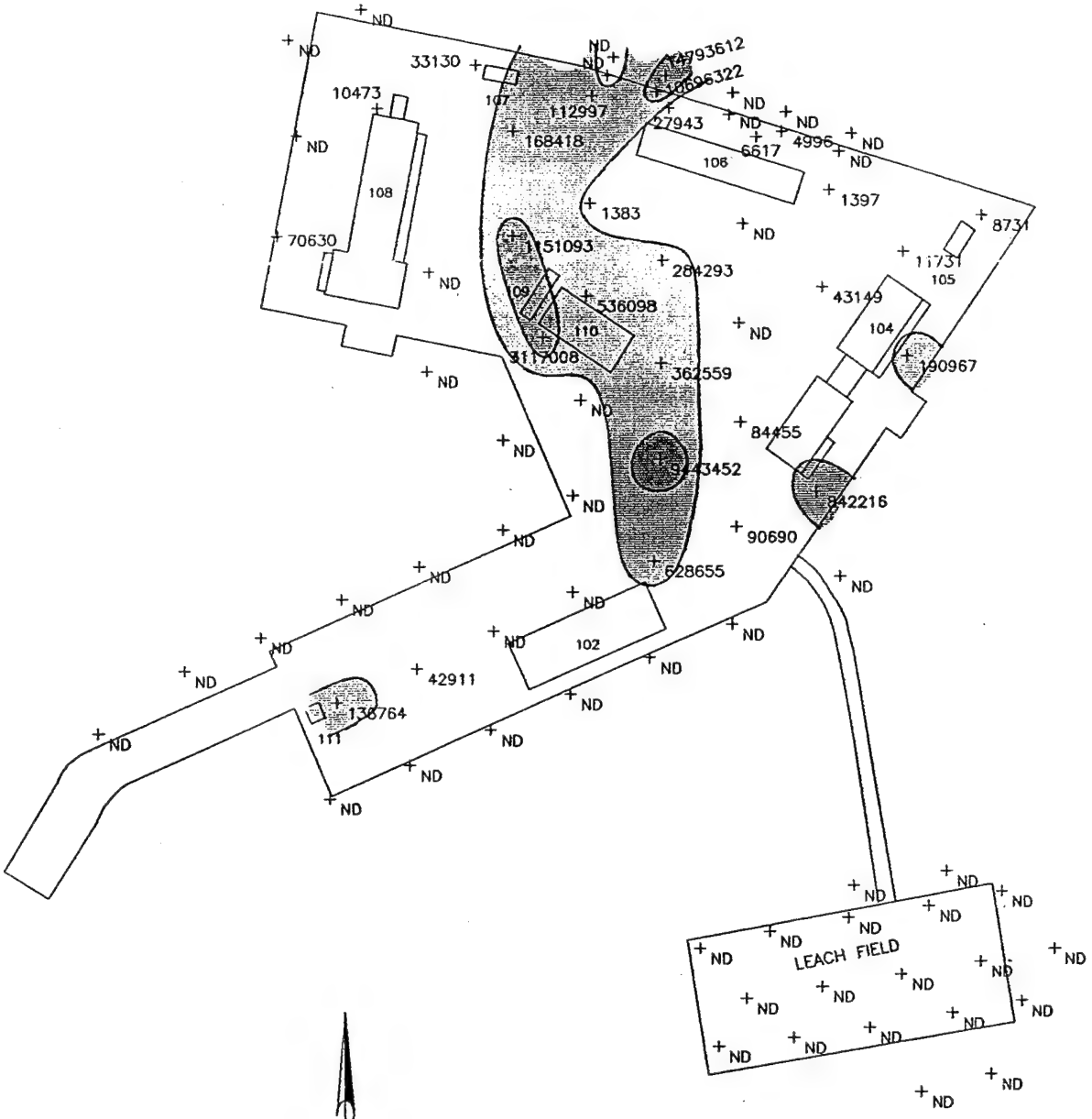
Slatersville, Rhode Island

PETREX FINGERPRINT TECHNOLOGY

Relative Response

Gasoline Character

Plate 2



0 100' 200' 300'

APPROXIMATE SCALE

SOURCE: PRELIMINARY ASSESSMENT, JUNE 1993

LEGEND	
Relative Response Values:	Features:
≥ 1,000,000	+ PETREX Sample Location
100,000 – 999,999	ND Not Detected

Northeast Research Institute LLC
605 Parfet Street
Suite 100
Lakewood, Colorado 80215
(303) 238-0090

Drawn By:	Project #:
JCS	2185E
Checked By:	Date:
	November 22, 1994
Project Manager:	File Name:
JCG	2185-3.dwg

Aneptek Corporation

North Smithfield ANGS
102ND Air Control Squadron
Slatersville, Rhode Island

PETREX FINGERPRINT TECHNOLOGY

Relative Response
Fuel Oil Character

Plate 3

APPENDIX B

FIELD GC SCREENING RESULTS

ECT Environmental Control Technologies, Inc.

[illegible] Suite 19
Bedford, NH 03110
(603) 668-0707
Fax (603) 668-0767
800-962-3755

101 Federal Street
Suite 1900
Boston, MA 02110
(617) 342-3669
Fax (617) 342-7080
800-962-3755

FIELD GAS CHROMATOGRAPHY PROJECT

SOIL HEADSPACE ANALYSIS

December 14, 1994

SITE:

North Smithfield Air National Guard Base
Slatersville, Rhode Island

ECT Job # ANEPT.01446L3

Prepared for:

Mr. Jeffrey Healey
Program Manager
ANEPTEK Corporation
209 West Central Street
Natick, Massachusetts 01760

ECT Environmental Control Technologies, Inc.

9 Cedarwood Drive
Suite 16
Bedford, NH 03110
(603) 668-0707
Fax (603) 668-0767
800-962-3755

101 Federal Street
Suite 1900
Boston, MA 02110
(617) 342-3669
Fax (617) 342-7080
800-962-3755

FIELD GAS CHROMATOGRAPHY PROJECT
SOIL HEADSPACE ANALYSIS
North Smithfield Air National Guard Base
Slatersville, Rhode Island

INTRODUCTION

ECT has completed a Field Gas Chromatography Project at the above-referenced property (SITE) at the request of Mr. Jeffrey Healey of ANEPTEK Corporation (Client). This report is subject to the Limitations attached in Exhibit A.

This Field Gas Chromatography Project was conducted between November 29 and December 6, 1994, in order to identify volatile hydrocarbons and chlorinated solvents, specifically benzene, toluene, ethyl benzene, xylenes (BTEX), trichloroethene (TCE), 1,1,1-trichloroethane (TCA), dichlororethene (DCE), and perchloroethene (PCE), in sample headspace from soil samples collected at the SITE. ECT tested 40 soil samples on SITE (see RESULTS in TABLE 1) provided to ECT by the Client. A set of the sample chromatograms are provided in Exhibit B.

INSTRUMENTATION

An SRI Model 8610 gas chromatograph (GC), equipped with a 15-meter capillary column and photoionization detector (PID) was used to analyze samples on SITE. Data was acquired with an SRI Peak II computer-based software system.

METHODOLOGY

Method blanks and standards were analyzed daily to maintain quality control. A calibration was established based upon a standard prepared with BTEX, TCE, TCA, DCE, and PCE obtained from Supelco, Inc.

Identification of the analytes is based on a comparison of the retention times for the detected peaks against those associated with the calibration standard. Calibration standards were generally analyzed at the beginning and end of each day, after 8 to 10 samples, and after a transfer of the mobile laboratory to a new Area of Concern (AOC).

Quality Assurance/Quality Control

In order to evaluate the precision of the sampling and analytical methodology, samples of a 21.75 ug/l of benzene to 41.5 ug/l of perchroloethene calibration standards were analyzed at the beginning and end of each day as well as after every 8 to 12 samples analyzed. The concentration for toluene in the standard samples ranged from a low of .134 mg/l to a high of .171 mg/l (relative percent difference range of 12.2 to 12.9 %) while the total xylenes concentration ranged from a low of .732 mg/l to a high of .961 mg/l (relative percent difference range of 13.5 to 14.1 %).

Soil Samples

Approximately 2 mls of each soil sample were collected by the Client and associated sampling subcontractor, from split-spoon samples collected from the borings, and transferred into a 40 ml VOA vial containing 30 mls of distilled water. After resealing the vial, it was agitated for one minute and placed in a water bath at 40° C for five (5) minutes allowing the headspace to reach equilibrium. Subsequently, a 200 ul aliquot of sample was injected into the GC for analysis. Results were calculated as parts-per-billion (ppb).

Supporting materials follow.

ENVIRONMENTAL CONTROL TECHNOLOGIES, INC.

Andrew C. Tingley
Project Manager/Hydrogeologist

enclosures

TABLE 1

SOIL HEADSPACE
FIELD GAS CHROMATOGRAPY RESULTS

North Smithfield Air National Guard
Slatersville, Rhode Island

SAMPLE ID	SB-01-02	SB-01-04	SB-01-06	SB-01-08	SB-02-02	SB-02-07	SB-03-04.5	SB-03-08.5
SAMPLE DEPTH (in feet)	0-2	2-4	4-6	6-8	0-2	5-7	2.5-4.5	6.5-8.5
DATE SAMPLED	11/29/94	11/29/94	11/29/94	11/29/94	11/29/94	11/29/94	11/30/94	11/30/94
DETECTOR	PID	PID	PID	PID	PID	PID	PID	PID
MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
ANALYTE	Concentrations (in parts per billion)							
Benzene	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND
Total Xylenes	ND	141	364	80	ND	93	ND	ND
Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	ND	ND	ND	ND	ND	ND	ND	ND
# of Unknowns/ Estimated Range	1 104	20 327-1967	19 310-3875	11 227-975	1 581	3 133-1866	ND	ND

PID = Photoionization detector
ND = Not Detected

TABLE 1 (continued)

SOIL HEADSPACE
FIELD GAS CHROMATOGRAPY RESULTS

North Smithfield Air National Guard
Slatersville, Rhode Island

SAMPLE ID	SB-03-10.5	SB-03-12	SB-04-02	SB-04-09	SB-05-02	SB-05-06.5	SB-05-12	SB-05-16
SAMPLE DEPTH (in feet)	8.5-10.5	10-12	0-2	7-9	0-2	4.5-6.5	10-12	14-16
DATE SAMPLED	11/30/94	11/30/94	11/30/94	11/30/94	11/30/94	11/30/94	11/30/94	11/30/94
DETECTOR	PID	PID	PID	PID	PID	PID	PID	PID
MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
ANALYTE	Concentrations (in parts per billion)							
Benzene	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	164	ND	111	ND	ND	ND	ND
Total Xylenes	ND	ND	ND	ND	ND	390	528	1430
Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	ND	ND	ND	1207	ND	1190	ND	ND
# of Unknowns/ Estimated Range	ND	ND	ND	1 1028	ND	1 923	1 307	2 202+282

PID = Photolonization detector
ND = Not Detected

TABLE 1 (continued)

SOIL HEADSPACE
FIELD GAS CHROMATOGRAPY RESULTS

North Smithfield Air National Guard
Slatersville, Rhode Island

SAMPLE ID	SB-06-02	SB-06-07	SB-06-12	SB-07-02.5	SB-08-02.5	SB-08-07.5	SB-09-02.5	SB-09-07.5
SAMPLE DEPTH (in feet)	0-2	5-7	10-12	0.5-2.5	0.5-2.5	5.5-7.5	0.5-2.5	5.5-7.5
DATE SAMPLED	12/1/94	12/1/94	12/1/94	12/1/94	12/1/94	12/1/94	12/2/94	12/2/94
DETECTOR	PID	PID	PID	PID	PID	PID	PID	PID
MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
ANALYTE	Concentrations (in parts per billion)							
Benzene	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	110
Total Xylenes	ND	55	129	ND	ND	287	ND	92
Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	ND	ND	ND	ND	ND	ND	ND	ND
# of Unknowns/ Estimated Range	1 509	2 74+407	2 101+336	1 168	ND	ND	ND	2 92+335

PID = Photoionization detector
ND = Not Detected

TABLE 1 (continued)

SOIL HEADSPACE
FIELD GAS CHROMATOGRAPY RESULTS

North Smithfield Air National Guard
Slatersville, Rhode Island

SAMPLE ID	SB-09-12	SB-10-02	SB-10-04	SB-10-06	SB-10-08	SB-11-02	SB-11-07	SB-11-12
SAMPLE DEPTH (in feet)	10-12	0-2	2-4	4-6	6-8	0-2	5-7	10-12
DATE SAMPLED	12/2/94	12/2/94	12/2/94	12/2/94	12/2/94	12/5/94	12/5/94	12/5/94
DETECTOR	PID	PID	PID	PID	PID	PID	PID	PID
MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
ANALYTE	Concentrations (in parts per billion)							
Benzene	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND
Total Xylenes	ND	ND	175	520	87	ND	240	ND
Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethane	ND	ND	ND	ND	ND	ND	142	ND
Tetrachloroethene	ND	ND	ND	572	ND	ND	ND	ND
# of Unknowns/ Estimated Range	2 96+108	ND	11 121-1373	14 163-7868	4 57-579	3 125-585	22 67-16,949	3 204-4489

PID = Photoionization detector
ND = Not Detected

TABLE 1 (continued)

SOIL HEADSPACE
FIELD GAS CHROMATOGRAPY RESULTS

North Smithfield Air National Guard
Slatersville, Rhode Island

SAMPLE ID	SB-12-02	SB-12-07	SB-12-12	SB-13-02.5	SB-13-07	SB-13-10.5	SB-14-02.5	SB-14-07
SAMPLE DEPTH (in feet)	0-2	5-7	10-12	0-2	5-7	8.5-10.5	0-2	5-7
DATE SAMPLED	12/5/94	12/5/94	12/5/94	12/6/94	12/6/94	12/6/94	12/6/94	12/6/94
DETECTOR	PID	PID	PID	PID	PID	PID	PID	PID
MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
ANALYTE	Concentrations (in parts per billion)							
Benzene	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND
Total Xylenes	ND	ND	ND	ND	ND	ND	ND	ND
Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	ND	ND	ND	ND	ND	ND	ND	ND
# of Unknowns/ Estimated Range	2 123+494	2 491+3081	3 765-2956	2 142+1900	3 77-1387	5 164-7010	2 74+89	3 61-244

PID = Photoionization detector
ND = Not Detected

EXHIBIT A

EXHIBIT A

LIMITATIONS

1. The conclusions and recommendations contained in this Field Gas Chromatography report are based solely on conditions that existed at the time of the survey and on the services provided, and are not based on scientific tasks or procedures beyond those described or beyond the budgetary and time constraints imposed by ANEPTEK Corporation (Client). The stated conclusions and recommendations represent the best professional judgement of Environmental Control Technologies, Inc. (ECT) and should not be construed as statements of scientific certainty. Specifically, ECT does not and cannot represent that the SITE contains no asbestos containing materials; solid waste; hazardous materials, substances, or wastes; petroleum products or other latent conditions beyond those observed during this Field Gas Chromatography report. No other warranty, expressed or implied, is made.

2. This Field Gas Chromatography report approximates environmental conditions at the SITE. Moreover, contamination and sources of contamination may not yet have manifested themselves at the time of the survey. In addition, ECT can not predict which potential issues will become actual problems, legal or otherwise, because laws and enforcement priorities may change and environmental conditions at the SITE may also change over time.

3. The analyses and conclusions in this report may be based in part upon chemical test data provided by other sources referenced herein and are contingent upon their validity. ECT did not attempt to independently verify the truthfulness, accuracy or completeness of all information reviewed or received during this study, and EDT disclaims any liability that may arise from its reliance on such information.

4. Observations were made of the SITE as indicated in this report. Where access to portions of the SITE was unavailable or limited, ECT renders no opinion as to the presence or potential presence of hazardous materials, substances or wastes, or petroleum products in those portions of the SITE.

5. This Field Gas Chromatography report did not include an investigation as to whether any and all activities performed on the SITE have been granted all required environmental permits or licenses, or are or have been conducted in compliance with any or all applicable environmental laws and regulations. Accordingly, ECT makes no representations and offers no opinions as to whether any and all activities performed thereon are, or have been, conducted in compliance with all applicable environmental laws and regulations.

6. Inspections for asbestos containing materials (ACM), airborne radon and lead paint are outside of the scope of this Field Gas Chromatography report, however, to the extent that ECT becomes aware of the potential presence of one or more of these materials as a consequence of our visual inspection or record review, ECT will report this information to Client.

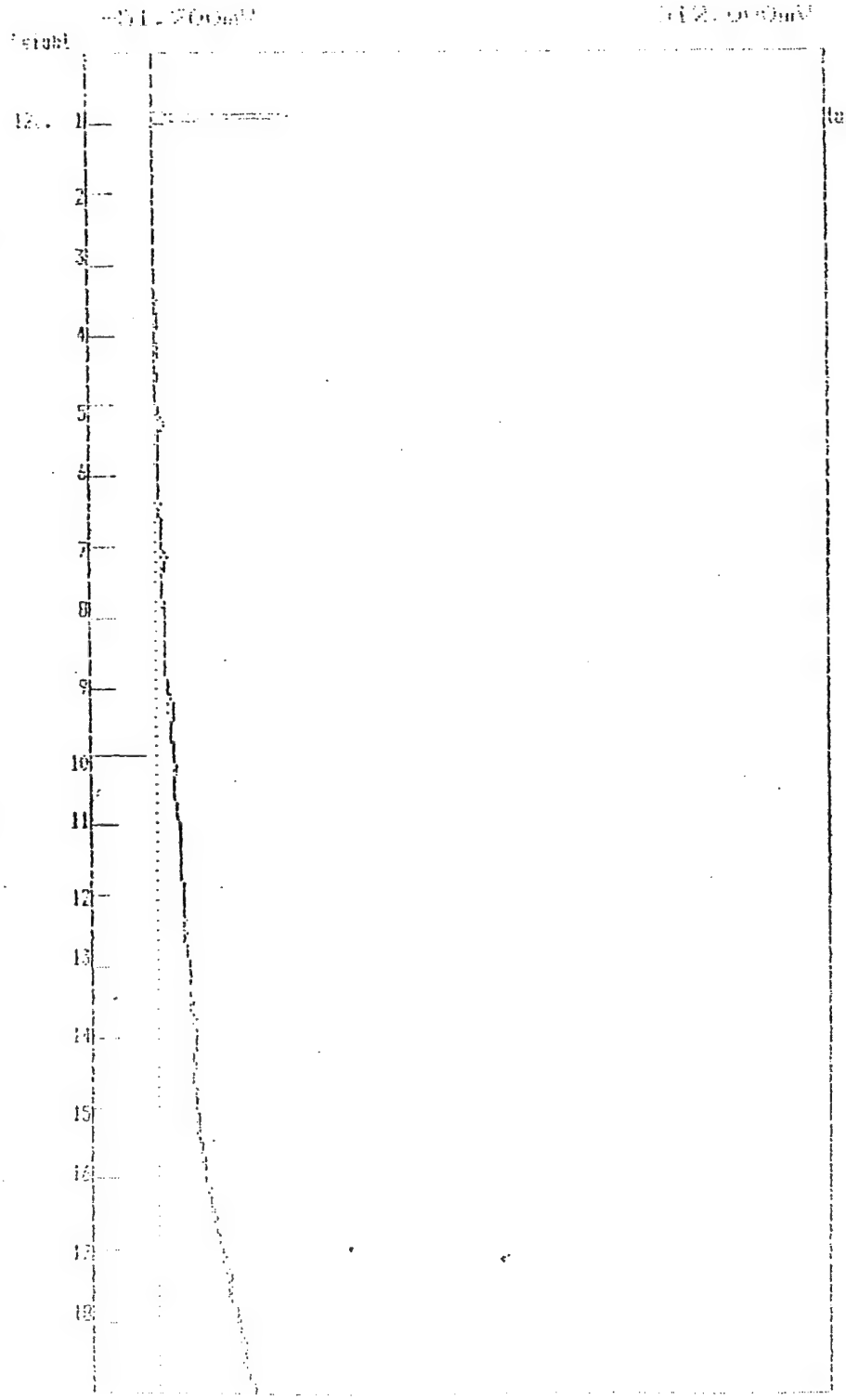
7. This Field Gas Chromatography report was prepared solely for the exclusive use of Client in accordance with generally accepted scientific practices strictly for use as a preliminary environmental evaluation of the SITE, and no other party may rely upon the information contained herein. ECT acknowledges and agrees that Client may convey this report to the seller, Title Insurer or others directly associated with the transaction of the SITE. No warranty, expressed or implied, is made or extended to any such third parties, all of whom may rely upon the information in this report at their own risk and without any legal recourse against ECT, its officers, directors, employees or agents, regardless of the legal basis for their claims; provided, however, that no third party may rely upon this report unless it agrees to be bound by these terms. To the extent that any warranty is made in this Field Gas Chromatography report, it may not be assigned by Client to any other party.

8. ECT makes no guarantee, warranty, or other representation that this report will necessarily be found in a judicial process to satisfy the "all appropriate inquiry" standard set forth in the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. Section 9601 et seq., or in its analogues set forth in comparable state or local statutes, ordinances, rules, or regulations.

EXHIBIT B

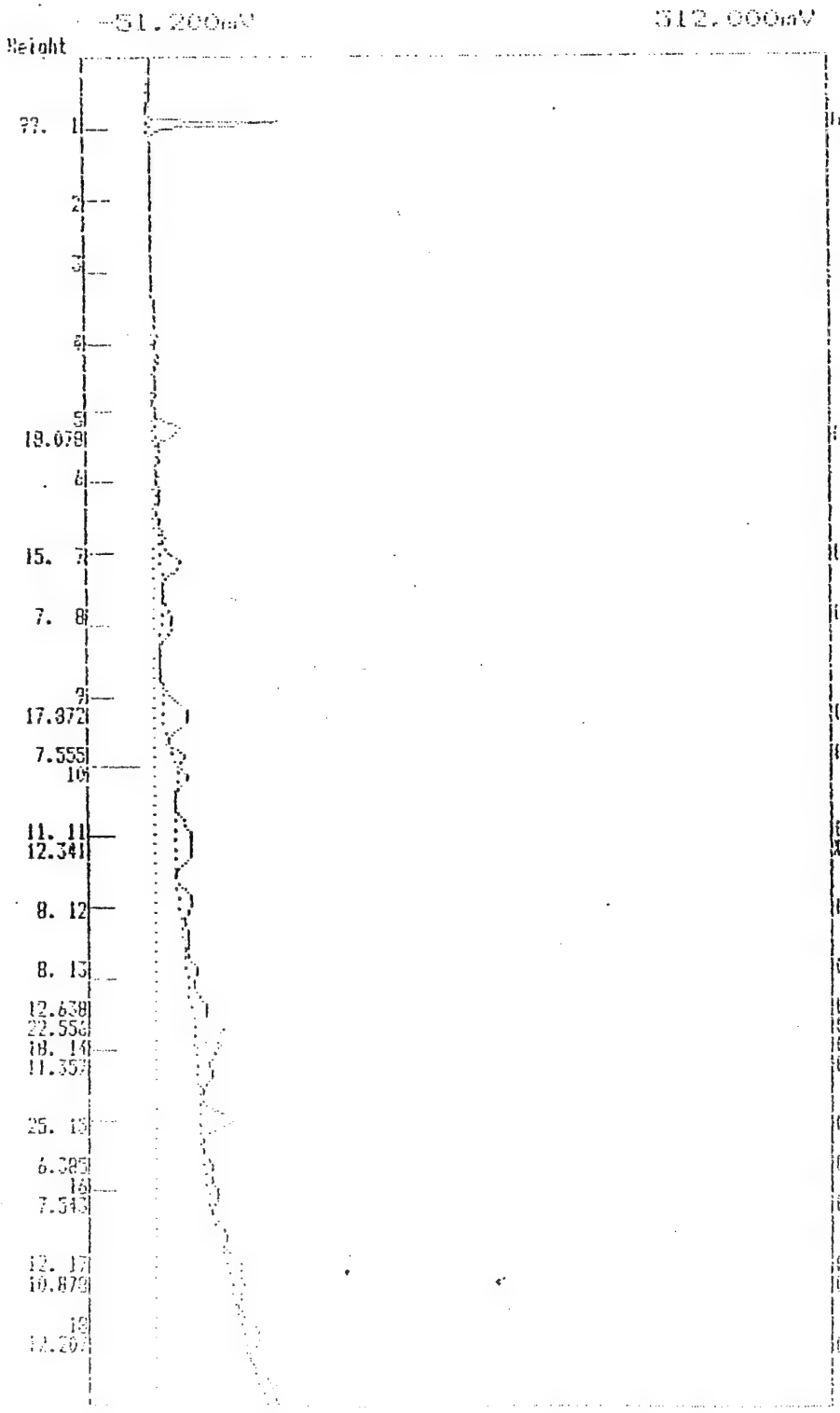
SB-01-02

Lab name : ECT Mobile 1
Client : ANEPTEK
Client ID : 01446.L3
Collected : 11/29/94
Holding time : < 24 hrs
Analysis date : 11/29/1994 12:15:47
Method : Direct Injection
Description : ANEPTEK - No. Smithfield
Column : MXT-1 0.53mm x 15 M
Carrier : Nitrogen
Data file : ANEP02.CHR (c:\chrom\data\aneptek)
Sample : 200 ul vapor
Operator : Andrew Tingley



Component	Retention	Area	External
Unknown)	0.883	575.78	N/A

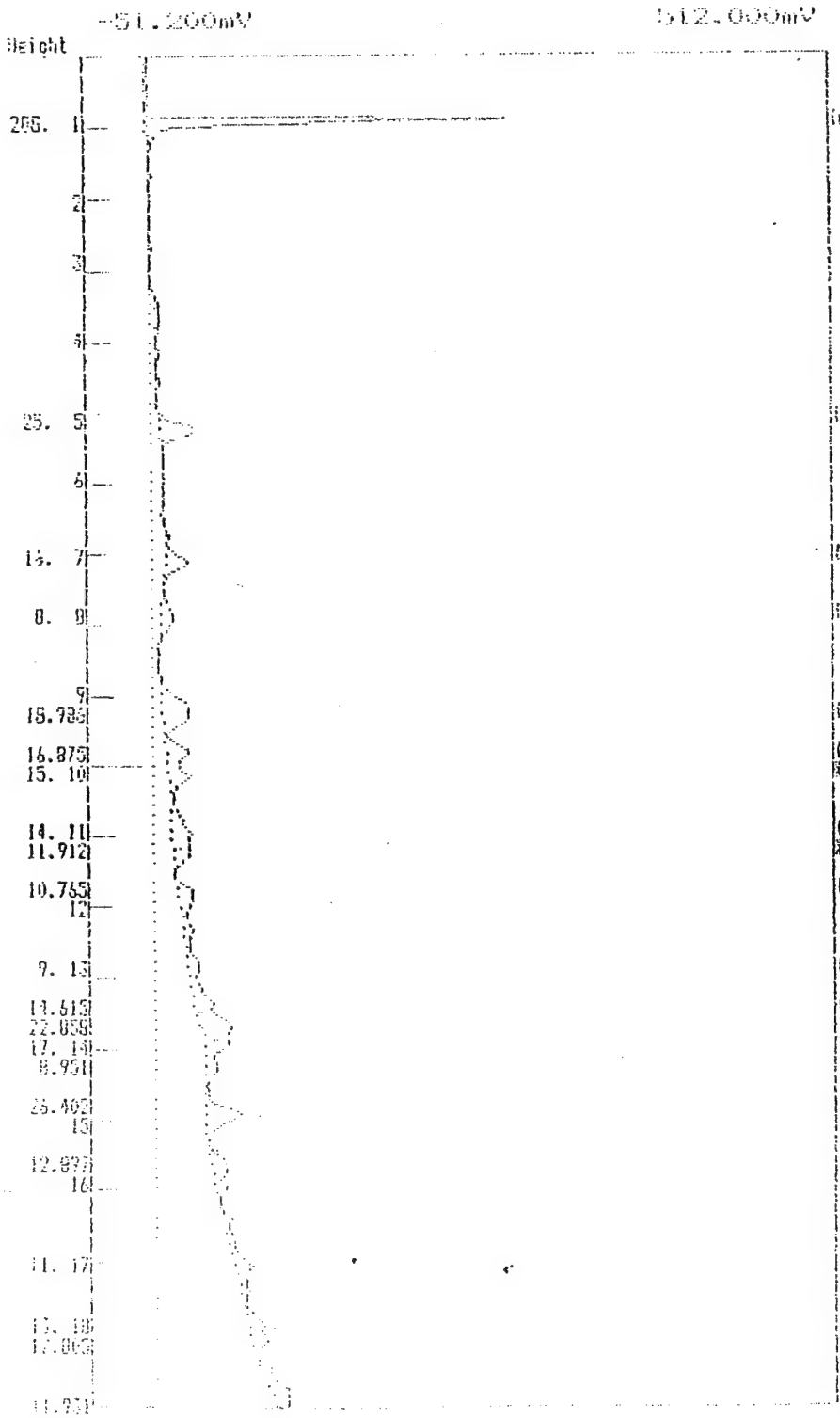
Lab name : ECT Mobile 1
Client : ANEPTEK
Client ID : 01946.L3
Collected : 11/29/94
Holding time : < 24 hrs
Analysis date : 11/29/1994 12:45:02
Method : Direct Injection
Description : ANEPTEK - No. Smithfield
Column : MXT-1 0.53mm x 15 M
Carrier : Nitrogen
Data file : ANEPB3.CHR (c:\chrom\data\aneptek)
Sample : 200 ul vapor
Operator : Andrew Tingley



Component	Retention	Area	External
(unknown)	0.900	522.41	N/A
(unknown)	5.266	249.94	N/A
(unknown)	7.150	309.43	N/A
(unknown)	7.966	182.15	N/A
(unknown)	9.333	477.62	N/A
(unknown)	9.866	103.85	N/A
(unknown)	11.000	216.45	N/A
Xylene3	11.266	215.19	21.53
(unknown)	11.950	201.00	N/A
(unknown)	12.933	134.27	N/A
(unknown)	13.383	222.61	N/A
(unknown)	13.750	336.69	N/A
(unknown)	13.950	291.35	N/A
(unknown)	14.383	210.06	N/A
(unknown)	15.000	433.96	N/A
(unknown)	15.750	105.34	N/A
(unknown)	16.083	132.97	N/A
(unknown)	17.183	219.97	N/A
(unknown)	17.500	139.88	N/A
(unknown)	18.966	294.25	N/A

SB-01-06

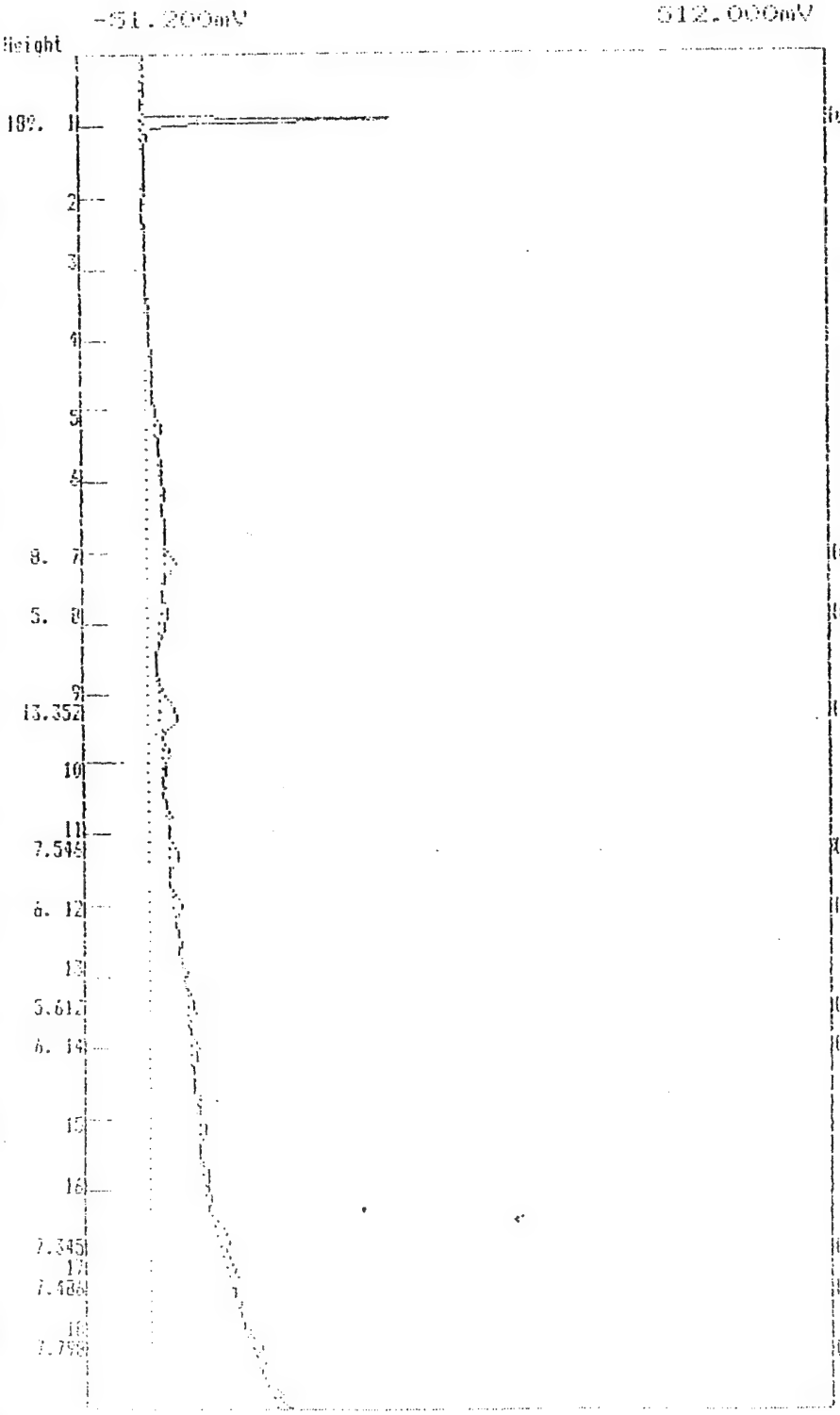
Lab name : ECT Mobile 1
Client : ANEPTEK
Client ID : 01446.L3
Collected : 11/29/94
Holding time : < 24 hrs
Analysis date : 11/29/1994 13:11:55
Method : Direct Injection
Description : ANEPTEK - No. Smithfield
Column : MXT-1 0.53mm x 15 M
Carrier : Nitrogen
Data file : ANEP04.CHR (c:\chrom\data\aneptek)
Sample : 200 ul vapor
Operator : Andrew Tingley



Component	Retention	Area	External
(unknown)	0.900	1416.10	N/A
(unknown)	5.233	352.35	N/A
(unknown)	7.133	232.39	N/A
(unknown)	7.966	204.16	N/A
(unknown)	9.316	531.68	N/A
(unknown)	9.783	251.48	N/A
Xylene1	10.133	242.05	27.17
(unknown)	10.966	310.33	N/A
Xylene3	11.283	198.44	19.85
(unknown)	11.966	231.76	N/A
(unknown)	12.883	147.94	N/A
(unknown)	13.383	261.71	N/A
(unknown)	13.733	424.13	N/A
Tri Me Benzene	13.900	222.43	0.03
(unknown)	14.266	145.71	N/A
(unknown)	14.933	429.85	N/A
(unknown)	15.666	219.39	N/A
(unknown)	17.133	305.64	N/A
(unknown)	17.866	146.34	N/A
(unknown)	18.083	172.21	N/A
(unknown)	18.866	236.48	N/A

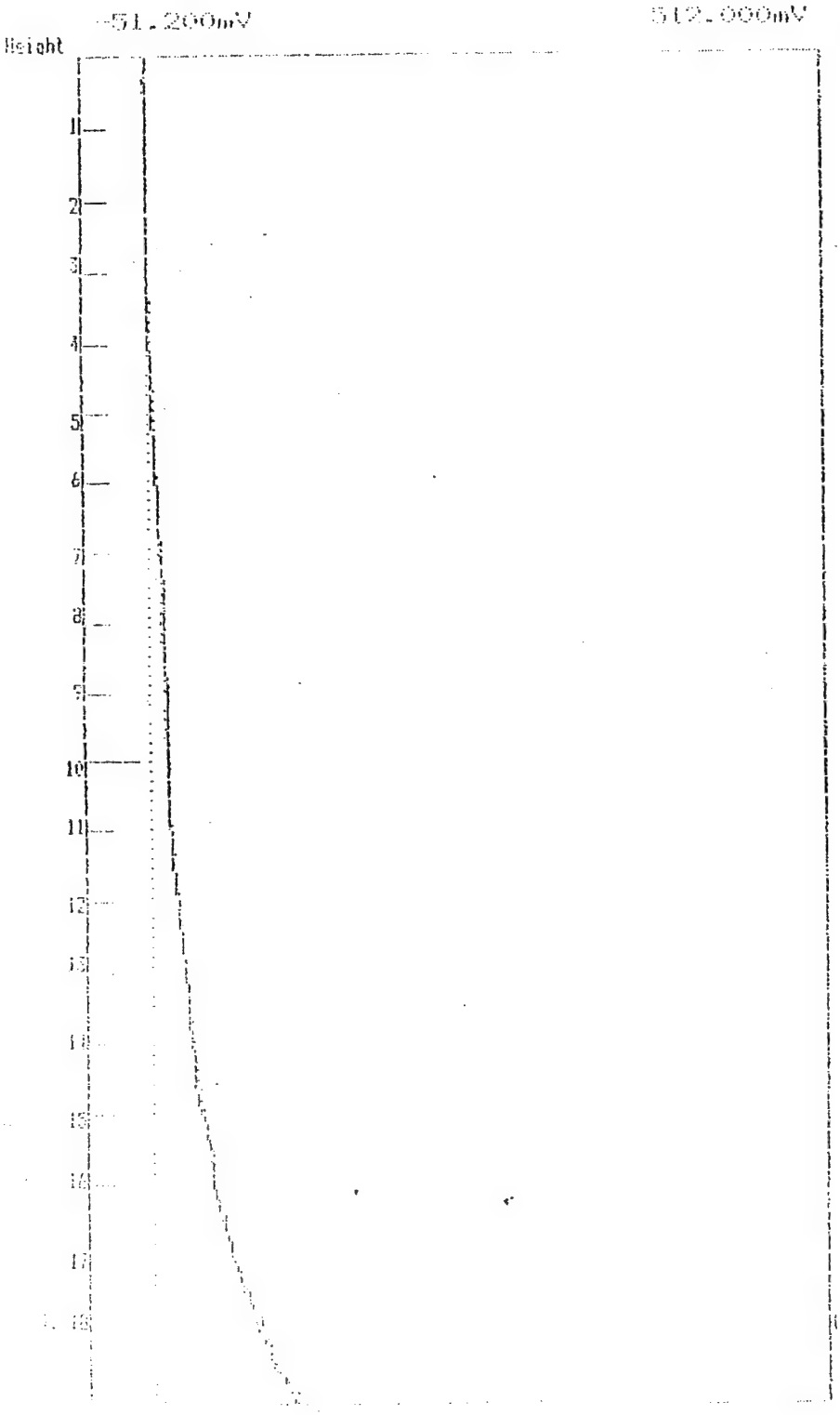
SB-01-08

Lab name : ECT Mobile 1
Client : ANEPTEK
Client ID : 01446.L3
Collected : 11/29/94
Holding time : < 24 hrs
Analysis date : 11/29/1994 13:39:47
Method : Direct Injection
Description : ANEPTEK - No. Smithfield
Column : MXT-1 0.53mm x 15 M
Carrier : Nitrogen
Data file : ANEPB5.CHR (c:\chrom\data\aneptek)
Sample : 200 ul vapor
Operator : Andrew Tingley



Component	Retention	Area	External
(unknown)	0.900	961.37	N/A
(unknown)	7.166	134.43	N/A
(unknown)	7.850	133.92	N/A
(unknown)	9.383	326.31	N/A
Xylenes	11.316	123.12	12.32
(unknown)	12.016	112.25	N/A
(unknown)	13.533	114.42	N/A
(unknown)	14.016	129.46	N/A
(unknown)	16.683	160.72	N/A
(unknown)	17.216	160.86	N/A
(unknown)	18.133	105.00	N/A

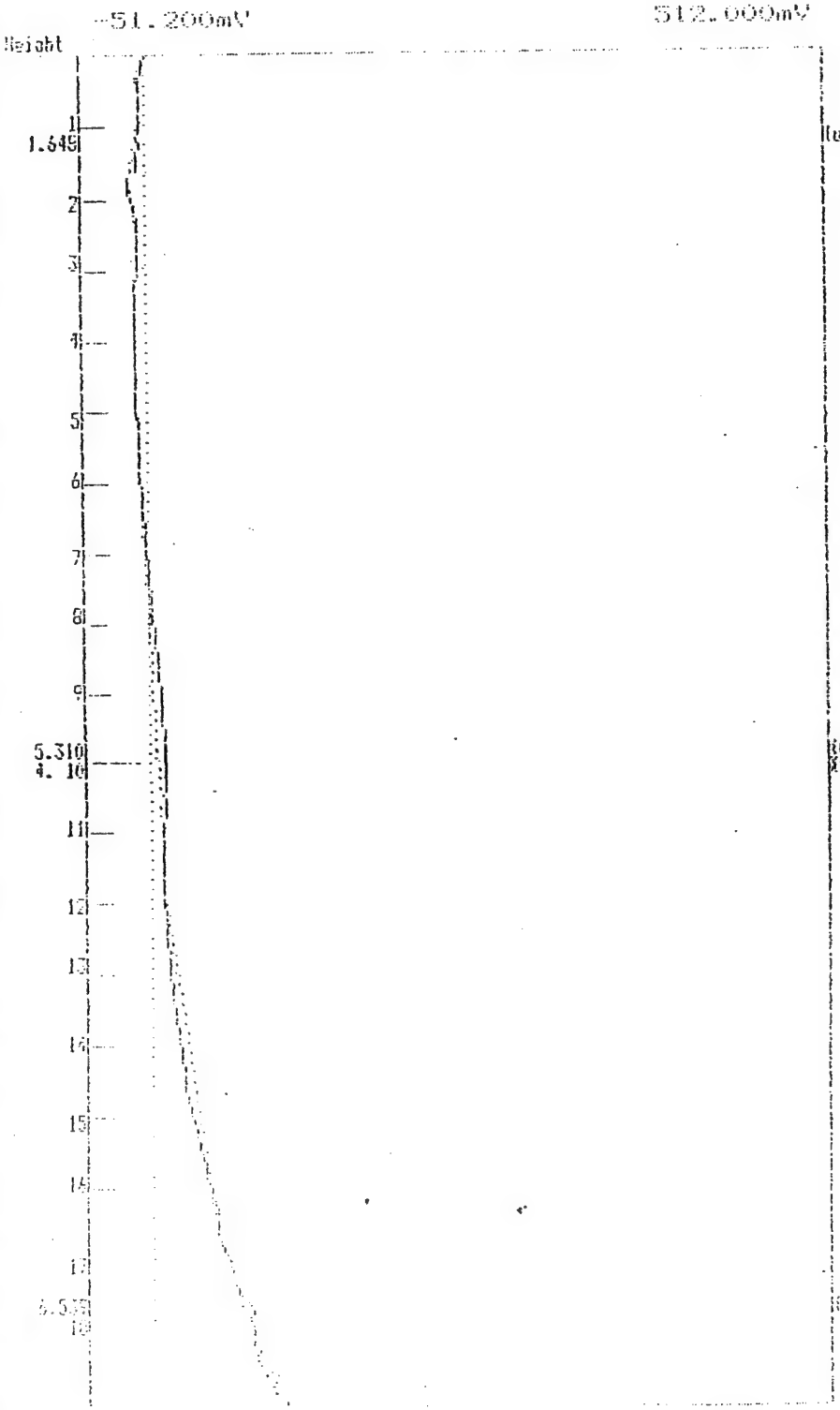
Lab name : ECT Mobile 1
Client : ANEPTEK
Client ID : 01446.L3
Collected : 11/29/94
Holding time : < 24 hrs
Analysis date : 11/29/1994 16:45:59
Method : Direct Injection
Description : ANEPTEK - No. Smithfield
Column : MXT-1 0.53mm x 15 M
Carrier : Nitrogen
Data file : ANEPB9.CHR (c:\chrom\data\aneptek)
Sample : 200 ul vapor
Operator : Andrew Tingley



Component	Retention	Area	External
Unknown	17.983	125.59	N/A

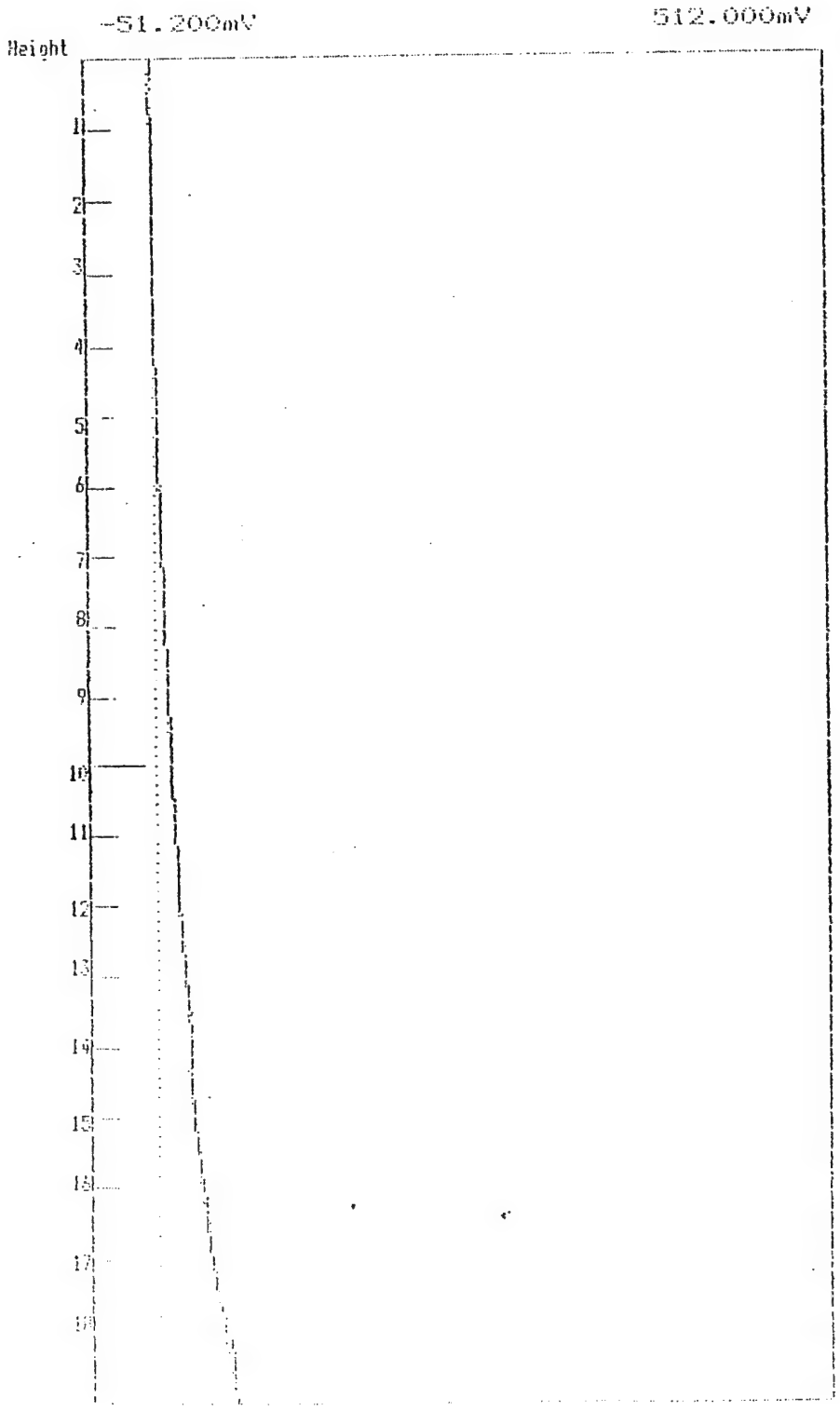
SB-02-07

Lab name : ECT Mobile 1
Client : ANEPTEK
Client ID : 01446.L3
Collected : 11/29/94
Holding time : < 24 hrs
Analysis date : 11/29/1994 17:12:18
Method : Direct Injection
Description : ANEPTEK - No. Smithfield
Column : MXT-1 0.53mm x 15 M
Carrier : Nitrogen
Data file : ANEPB10.CHR (c:\chrom\data\aneptek)
Sample : 200 ul vapor
Operator : Andrew Tingley



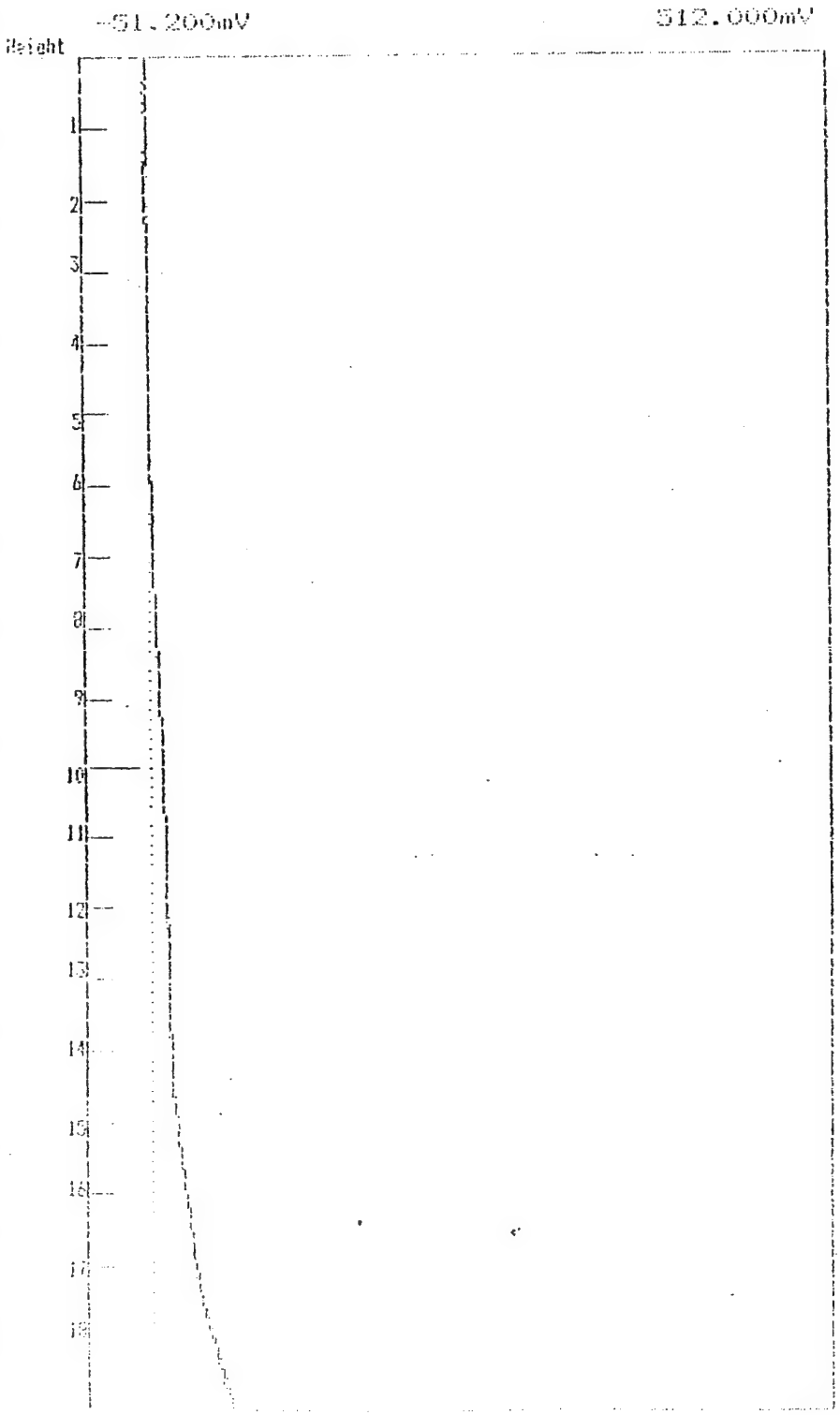
Component	Retention	Area	External
(unknown)	1.233	101.97	N/A
(unknown)	9.733	681.40	N/A
Xylenes	9.966	109.94	12.21
(unknown)	17.683	113.80	N/A

Sample ID : [illegible] 1
Collected : 11/30/94
Holding time : < 24 hrs
Analysis date : 11/30/1994 12:28:03
Method : Direct Injection
Description : ANEPTEK - No. Smithfield
Column : MXT-1 0.53mm x 15 M
Carrier : Nitrogen
Data file : ANEPC1.CHR (c:\chrom\data\aneptek)
Sample : 200 ul vapor
Operator : Andrew Tingley



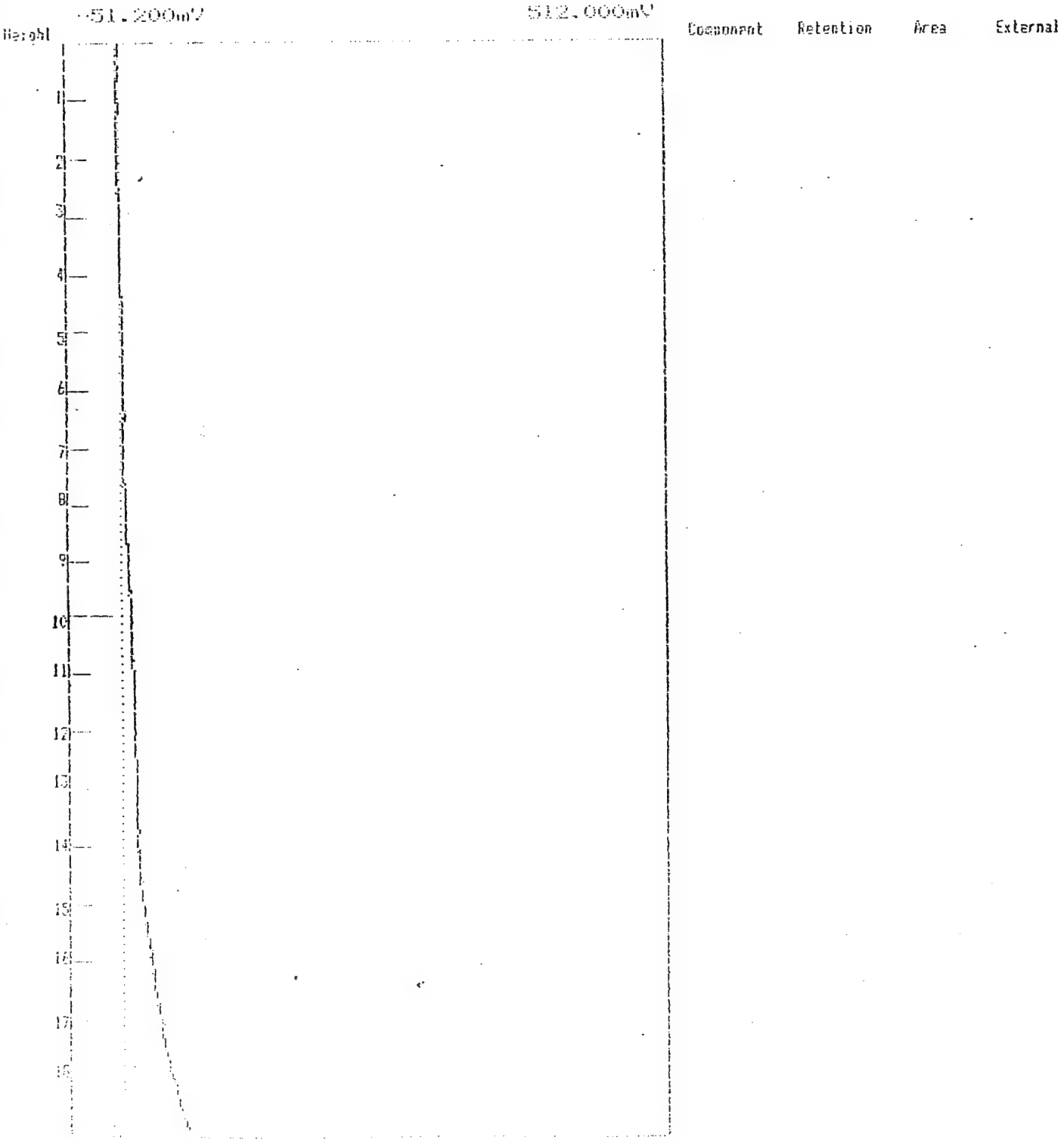
Component	Retention	Area	External

Lab name : ECT Mobile 1
Client : ANEPTEK
Client ID : 01446.L3
Collected : 11/30/94
Holding time : < 24 hrs
Analysis date : 11/30/1994 12:56:57
Method : Direct Injection
Description : ANEPTEK - No. Smithfield
Column : MXT-1 0.53mm x 15 M
Carrier : Nitrogen
Data file : ANEPC2.CHR (c:\chrom\data\aneptek)
Sample : 200 ul vapor
Operator : Andrew Tingley

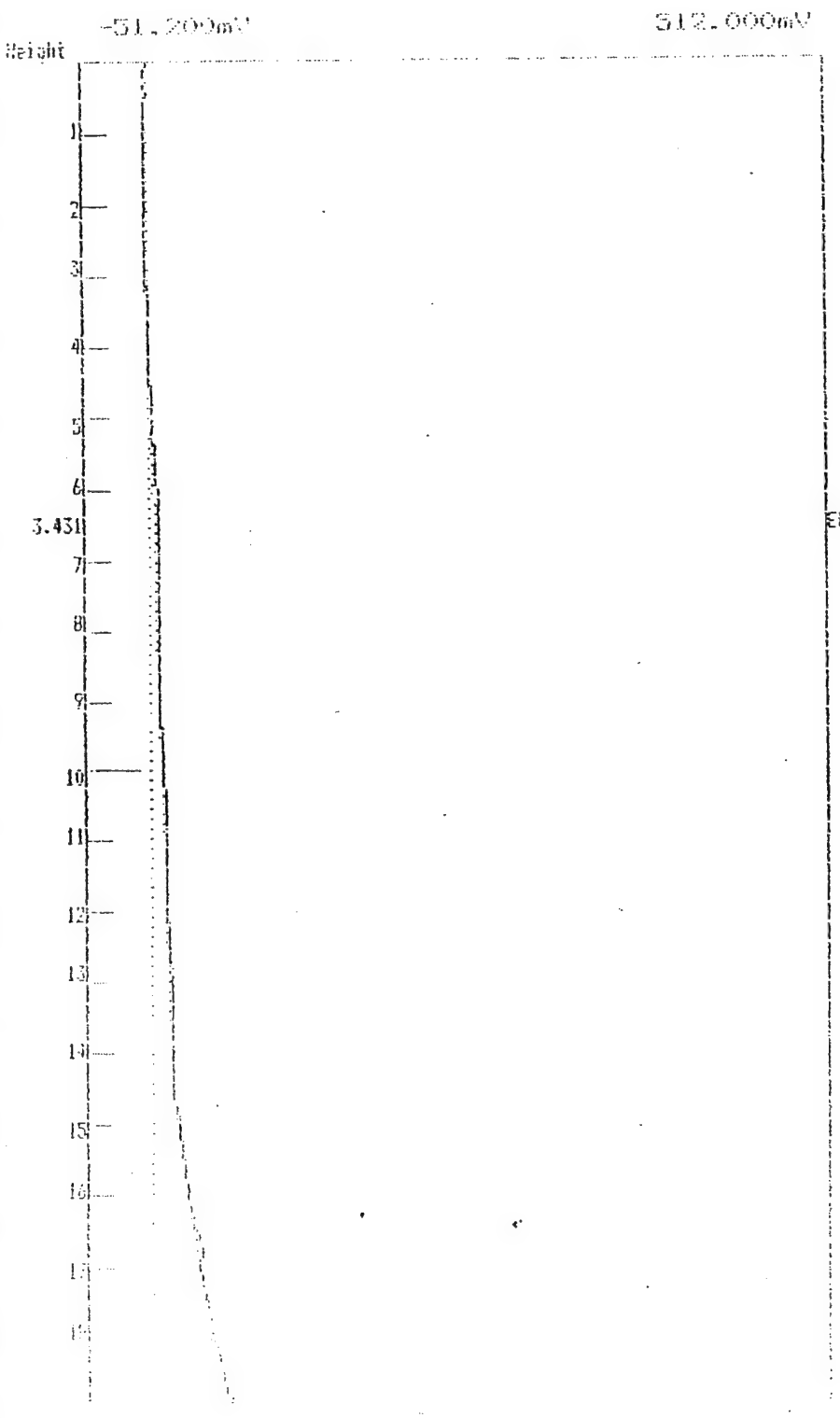


Component	Retention	Area	External

Lab name : ECT Mobile 1
Client : ANEPTEK
Client ID : 01446.L3
Collected : 11/30/94
Holding time : < 24 hrs
Analysis date : 11/30/1994 13:23:18
Method : Direct Injection
Description : ANEPTEK - No. Smithfield
Column : MXT-1 0.53mm x 15 M
Carrier : Nitrogen
Data file : ANEPC3.CHR (c:\chrom\data\aneptek)
Sample : 200 ul vapor
Operator : Andrew Tingley

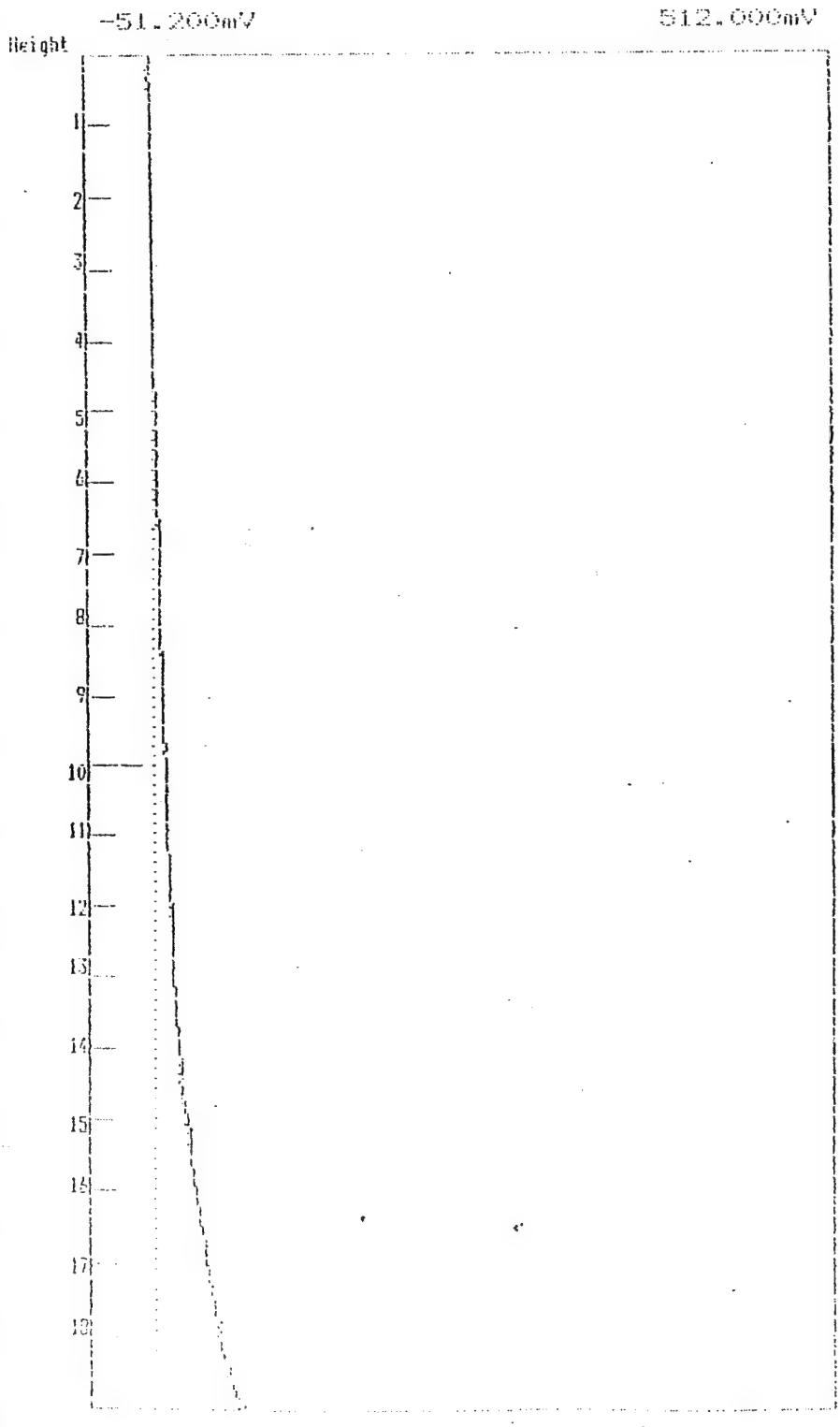


Lab name : ECT Mobile 1
Client : ANEPTEK
Client ID : 01446.L3
Collected : 11/30/94
Holding time : < 24 hrs
Analysis date : 11/30/1994 13:49:32
Method : Direct Injection
Description : ANEPTEK -- No. Smithfield
Column : MXT-1 0.53mm x 15 M
Carrier : Nitrogen
Data file : ANEPC4.CHR (c:\chrom\data\aneptek)
Sample : 200 ul vapor
Operator : Andrew Tingley



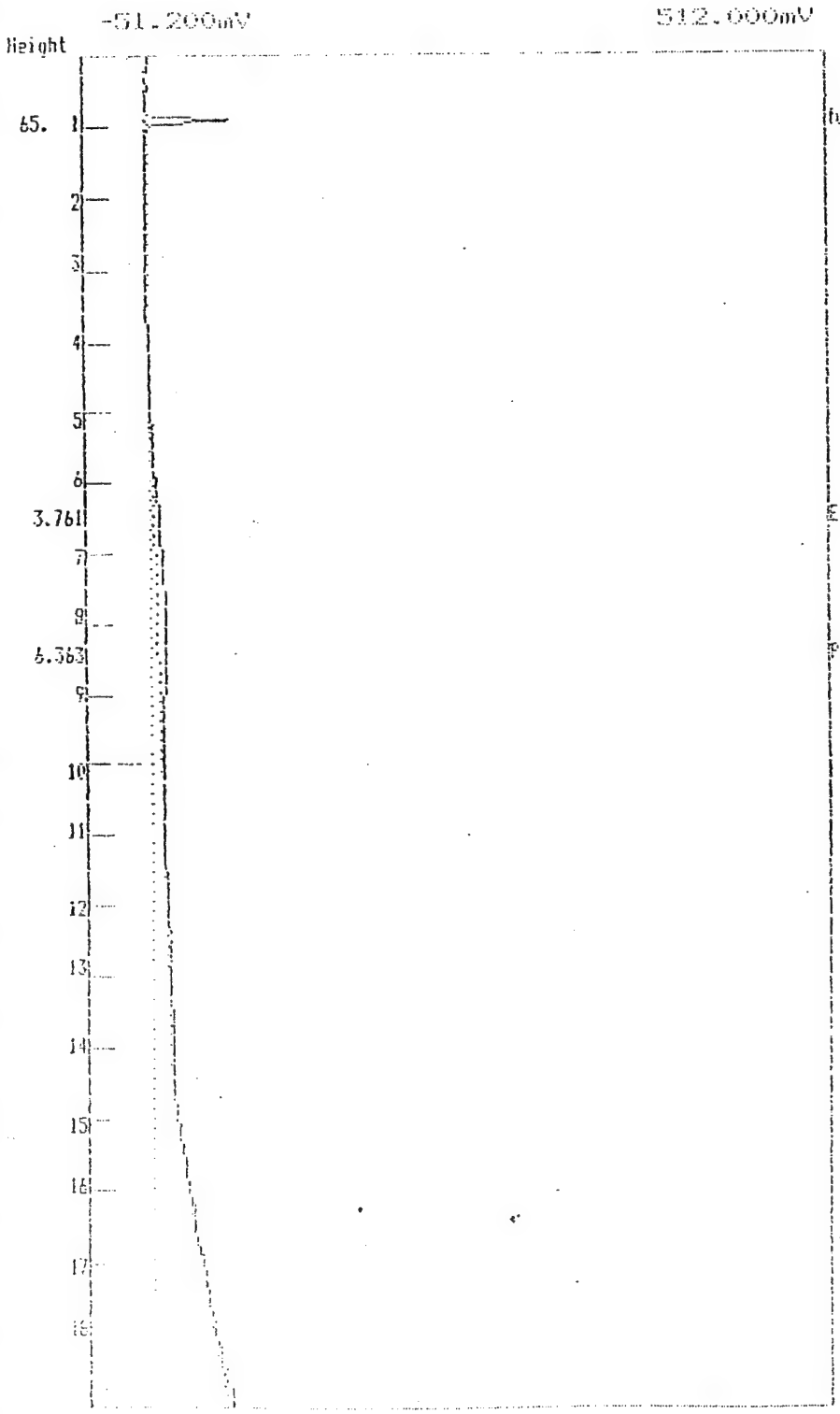
Component	Retention	Area	External
Ethyl Benzene	6.533	202.83	19.90

Lab name : ECT Mobile 1
Client : ANEPTEK
Client ID : 01446.L3
Collected : 11/30/94
Holding time : < 24 hrs
Analysis date : 11/30/1994 15:31:17
Method : Direct Injection
Description : ANEPTEK - No. Smithfield
Column : MXT-1 0.53mm x 15 M
Carrier : Nitrogen
Data file : ANEPC5.CHR (c:\chrom\data\aneptek)
Sample : 200 ul vapor
Operator : Andrew Tingley



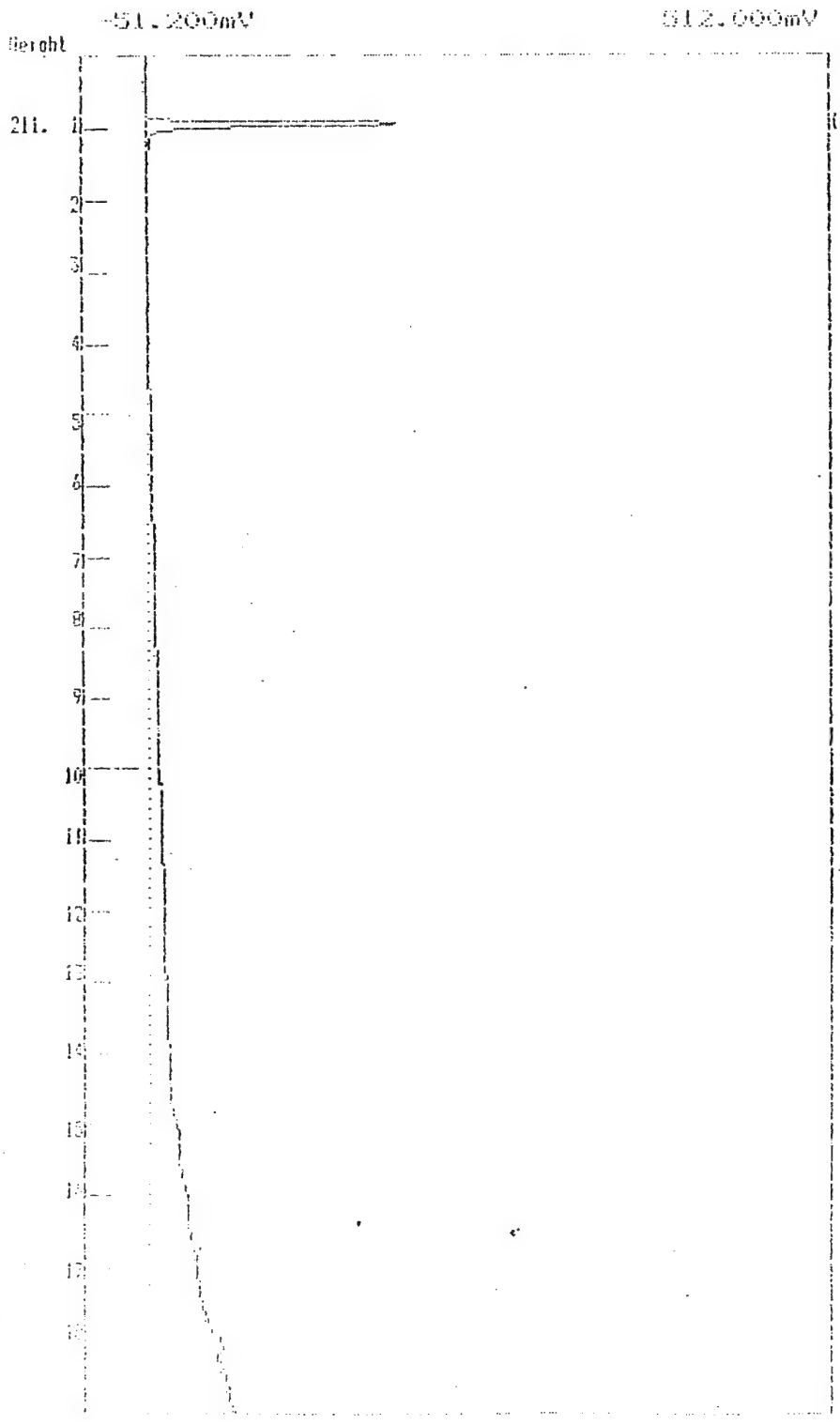
Component	Retention	Area	External

Lab name : ECT Mobile 1
Client : ANEPTEK
Client ID : 01446.L3
Collected : 11/30/94
Holding time : < 24 hrs
Analysis date : 11/30/1994 15:56:51
Method : Direct Injection
Description : ANEPTEK - No. Smithfield
Column : MXT-1 0.53mm x 15 M
Carrier : Nitrogen
Data file : ANEPC6.CHR (c:\chrom\data\aneptek)
Sample : 200 ul vapor
Operator : Andrew Tingley



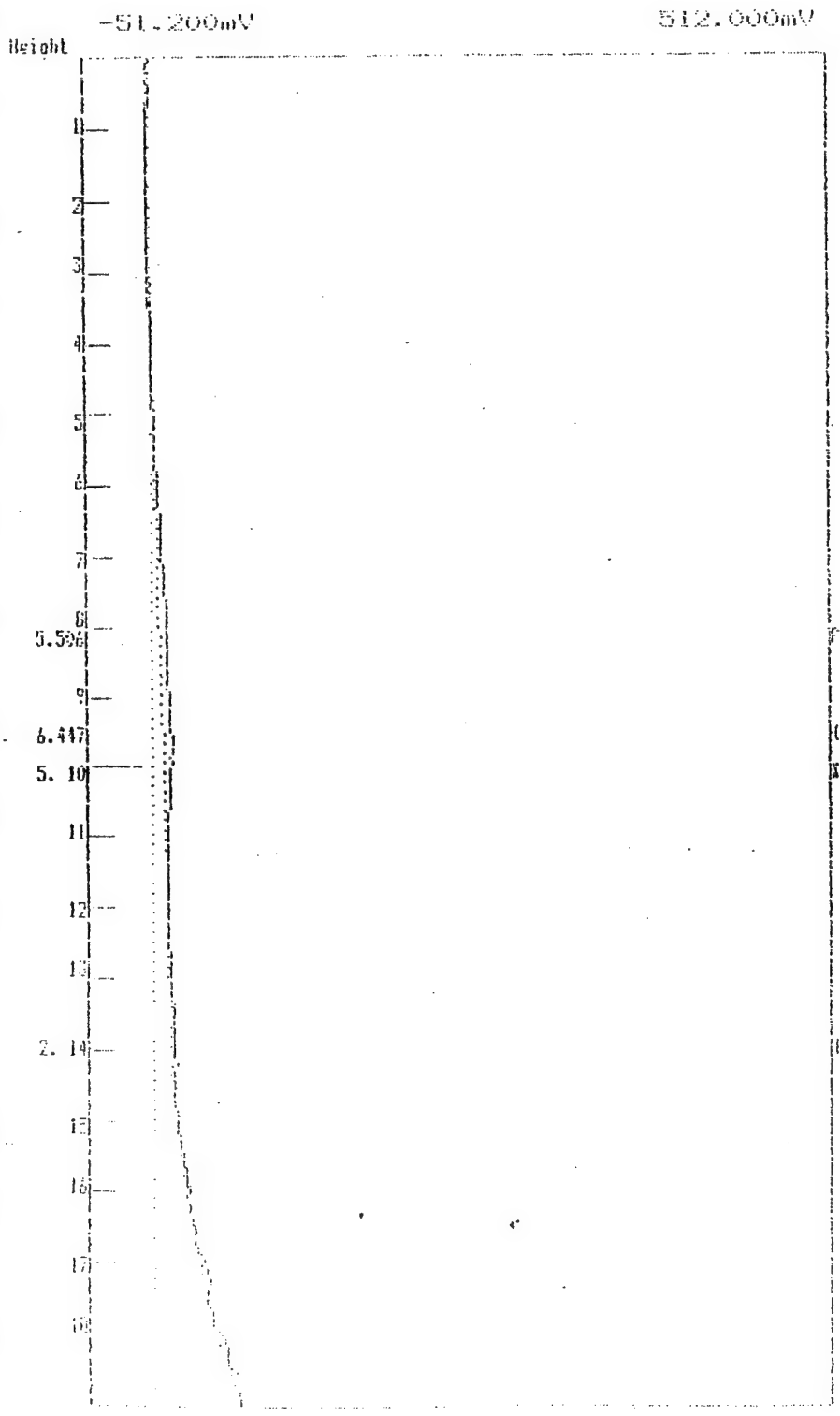
Component	Retention	Area	External
(unknown)	0.900	315.70	N/A
Ethyl Benzene	6.550	160.66	15.76
PCE	8.350	861.24	170.50

Lab name : ECT Mobile 1
Client : ANEPTEK
Client ID : 01446.L3
Collected : 11/30/94
Holding time : < 24 hrs
Analysis date : 11/30/1994 17:32:08
Method : Direct Injection
Description : ANEPTEK - No. Smithfield
Column : MXT-1 0.53mm x 15 M
Carrier : Nitrogen
Data file : ANEPC7.CHR (c:\chrom\data\aneptek)
Sample : 200 ul vapor
Operator : Andrew Tingley



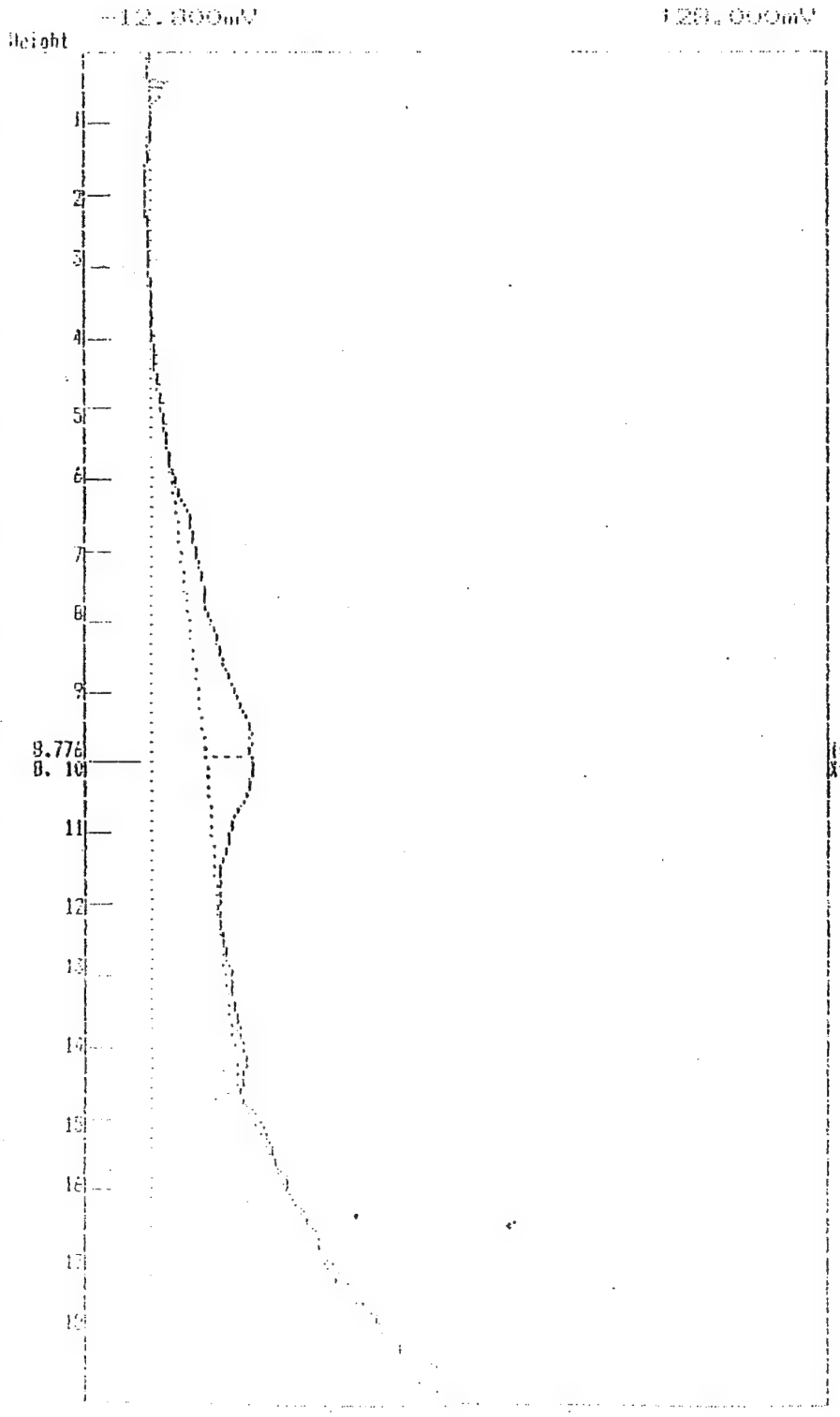
Component	Retention	Area	External
(unknown)	0.916	1031.57	N/A

Lab name : ECT Mobile 1
Client : ANEPTEK
Client ID : 01446.L3
Collected : 11/30/94
Holding time : < 24 hrs
Analysis date : 11/30/1994 17:57:29
Method : Direct Injection
Description : ANEPTEK - No. Smithfield
Column : MXT-1 0.53mm x 15 M
Carrier : Nitrogen
Data file : ANEPC8.CHR (c:\chrom\data\aneptek)
Sample : 200 ul vapor
Operator : Andrew Tingley



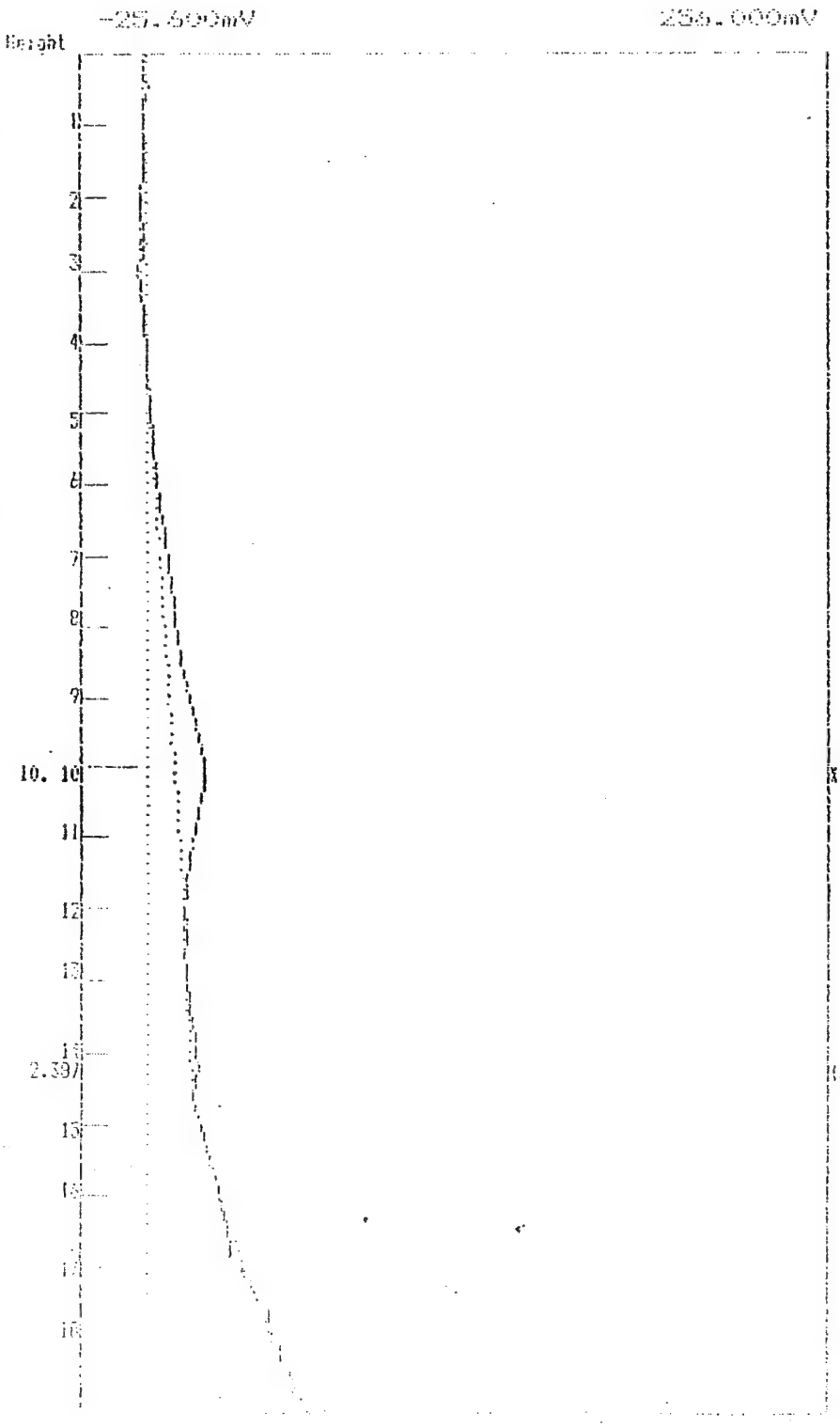
Component	Retention	Area	External
PCE	8.166	483.95	96.69
(unknown)	9.600	428.64	N/A
Xylene1	9.966	281.13	31.75
(unknown	14.016	115.67	N/A

Lab name : ECT Mobile 1
Client : ANEPTEK
Client ID : 01446.L3
Collected : 11/30/94
Holding time : < 24 hrs
Analysis date : 11/30/1994 18:23:36
Method : Direct Injection
Description : ANEPTEK - No. Smithfield
Column : NXT-1 0.53mm x 15 M
Carrier : Nitrogen
Data file : ANEPC9.CHR (c:\chrom\data\aneptek)
Sample : 200 ul vapor
Operator : Andrew Tingley



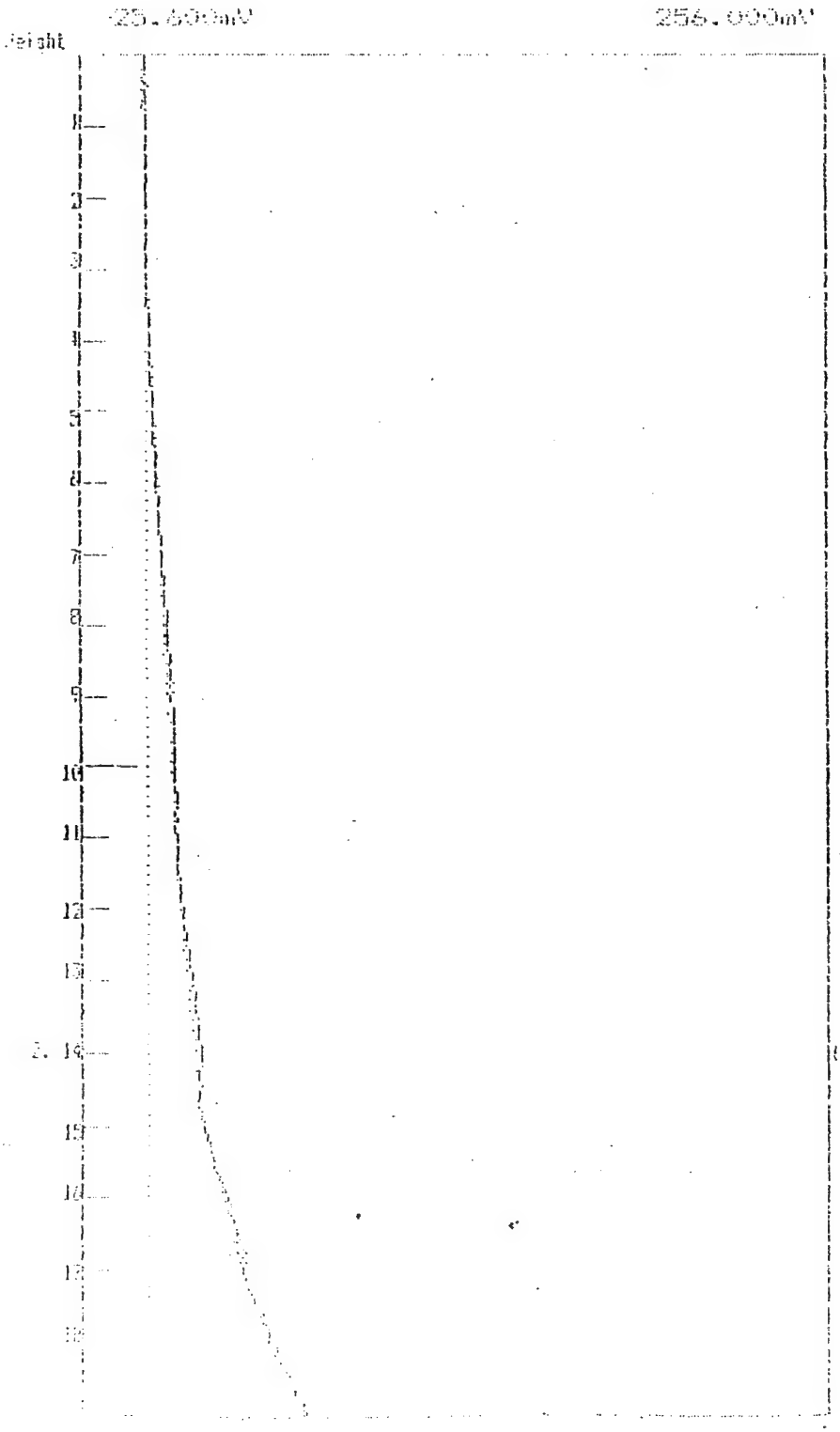
Component	Retention	Area	External
(unknown)	9.716	1026.79	N/A
Xylenes	10.135	522.77	60.07

Lab name : ECT Mobile 1
Client : ANEPTEK
Client ID : 01446.L3
Collected : 11/30/94
Holding time : < 24 hrs
Analysis date : 11/30/1994 18:49:23
Method : Direct Injection
Description : ANEPTEK - No. Smithfield
Column : RTX-1 0.53mm x 15 M
Carrier : Nitrogen
Data file : ANEPC10.CHR (c:\chrom\data\aneptek)
Sample : 200 ul vapor
Operator : Andrew Tinsley



Component	Retention	Area	External
Xylenes	10.165	1762.02	177.02
Unknown	14.233	131.55	N/A

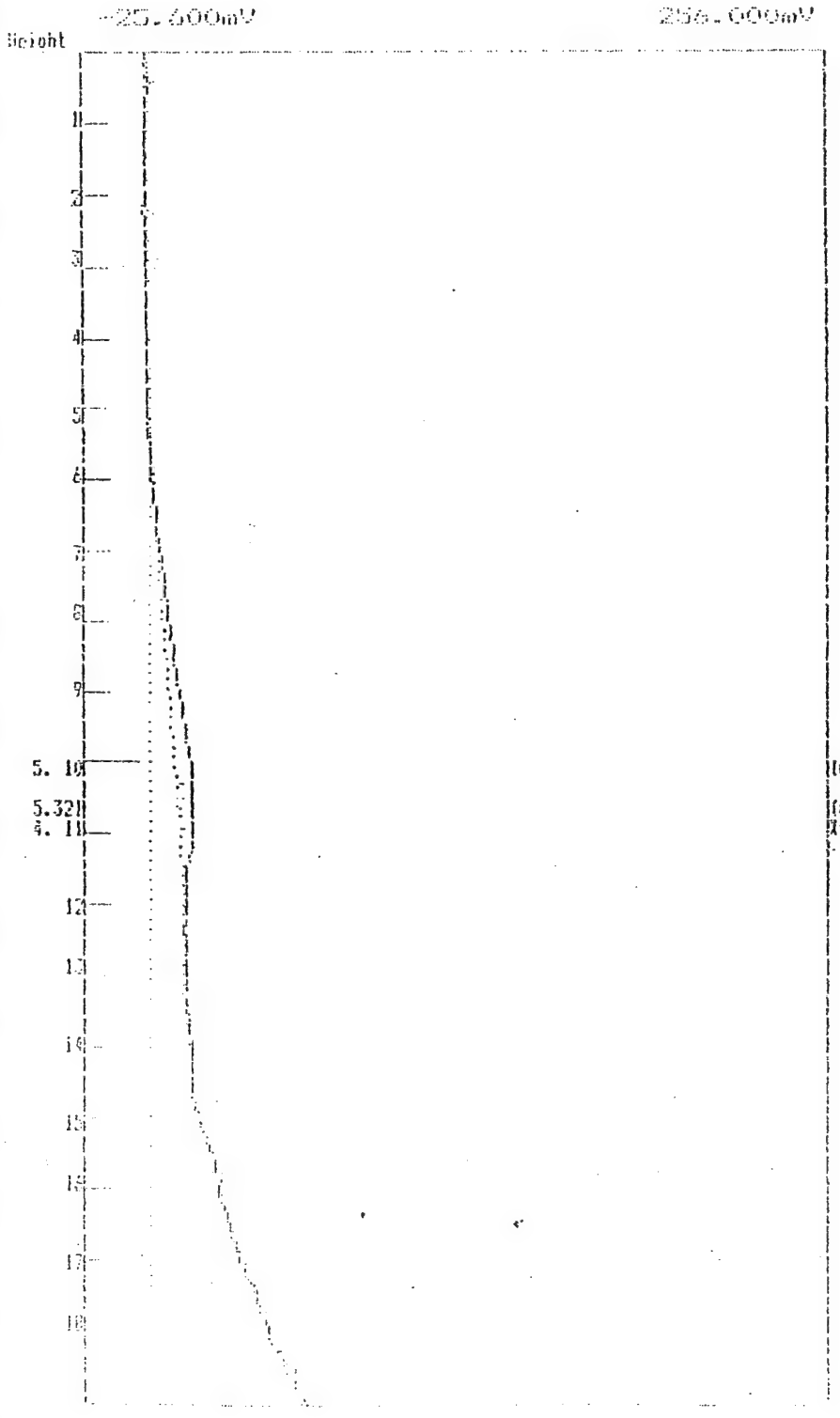
Lab name : ECT Mobile 1
Client : ANEPTEK
Client ID : 01446.L3
Collected : 12/1/94
Holding time : < 24 hrs
Analysis date : 12/01/1994 1):23:25
Method : Direct Injection
Description : ANEPTEK - Mo. Smithfield
Column : MXT-1 0.53mm x 15 M
Carrier : Nitrogen
Data file : ANEPD3.CHR (c:\chrom\data\aneptek)
Sample : 200 ul vapor
Operator : Andrew Tinglev



Component	Retention	Area	External
Unknown1	13.950	126.80	N/A

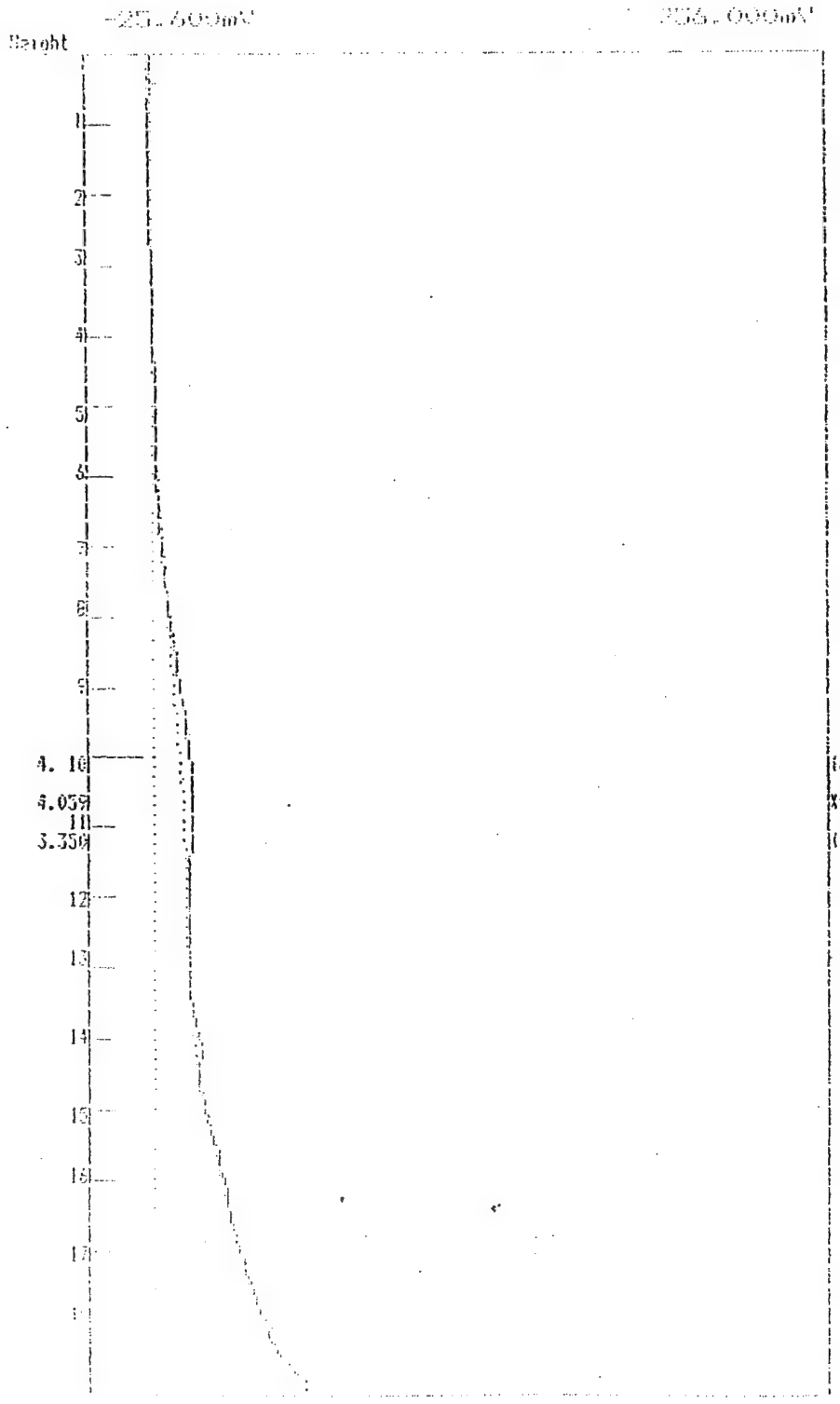
SB-06-07

Lab name : ECT Mobile 1
Client : ANEPTEK
Client ID : 01446.L3
Collected : 12/1/94
Holding time : < 24 hrs
Analysis date : 12/01/1994 11:40:43
Method : Direct Injection
Description : ANEPTEK - No. Smithfield
Column : MXT-1 0.53mm x 15 M
Carrier : Nitrogen
Data file : ANEPD4.CHR (c:\chrom\data\aneptek)
Sample : 200 ul vapor
Operator : Andrew Tingley



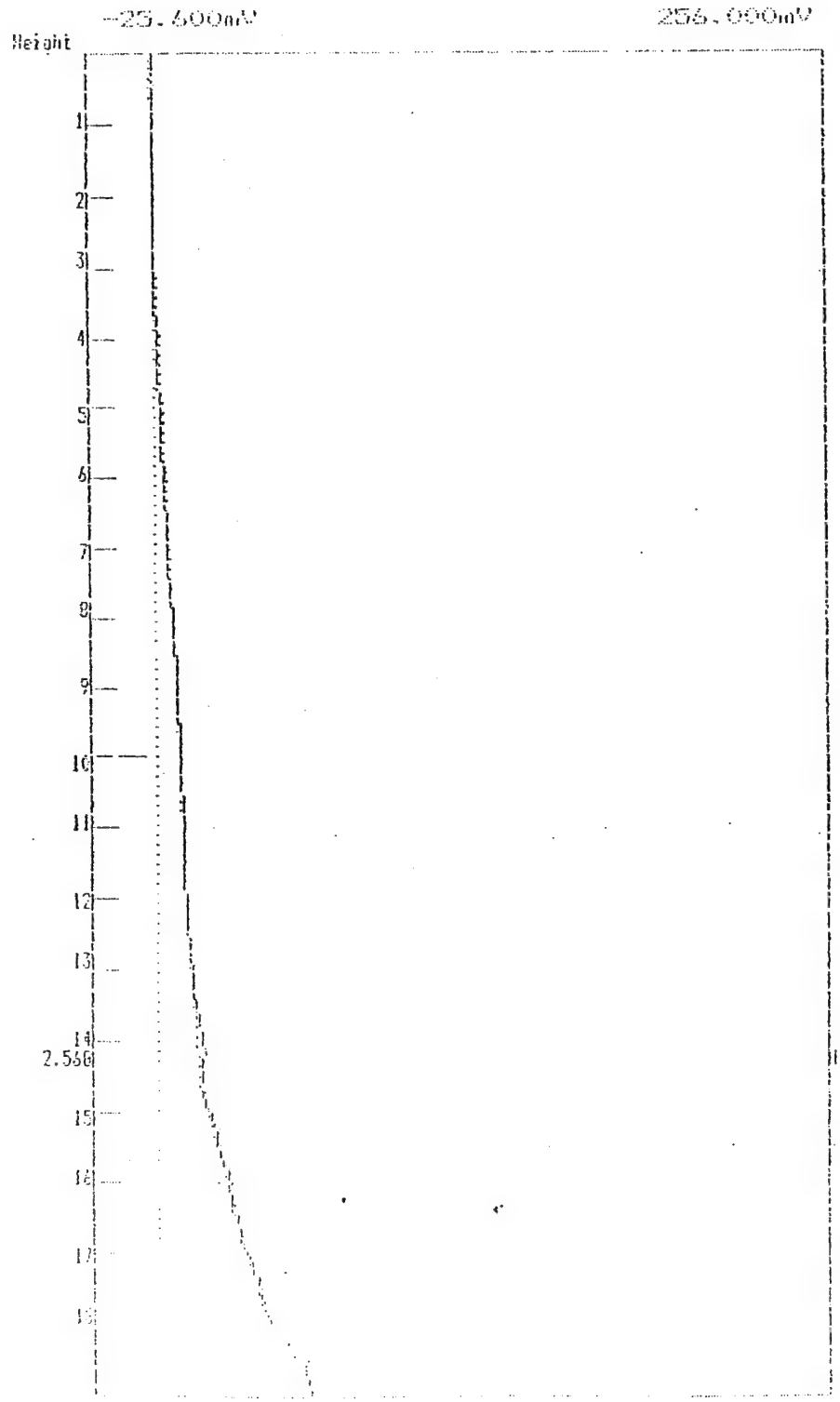
Component	Retention	Area	External
(unknown)	10.116	616.10	N/A
(unknown)	10.733	130.11	N/A
Xylene2	10.950	172.78	7.50

Lab name : ECT Mobile 1
Client : ANEPTEK
Client ID : 01446.L3
Collected : 12/1/94
Holding time : < 24 hrs
Analysis date : 12/01/1994 12:15:44
Method : Direct Injection
Description : ANEPTEK - No. Smithfield
Column : MXT-1 0.53mm x 15 M
Carrier : Nitrogen
Data file : ANEPD5.CHR (c:\chrom\data\aneptek)
Sample : 200 ul vapor
Operator : Andrew Tingley



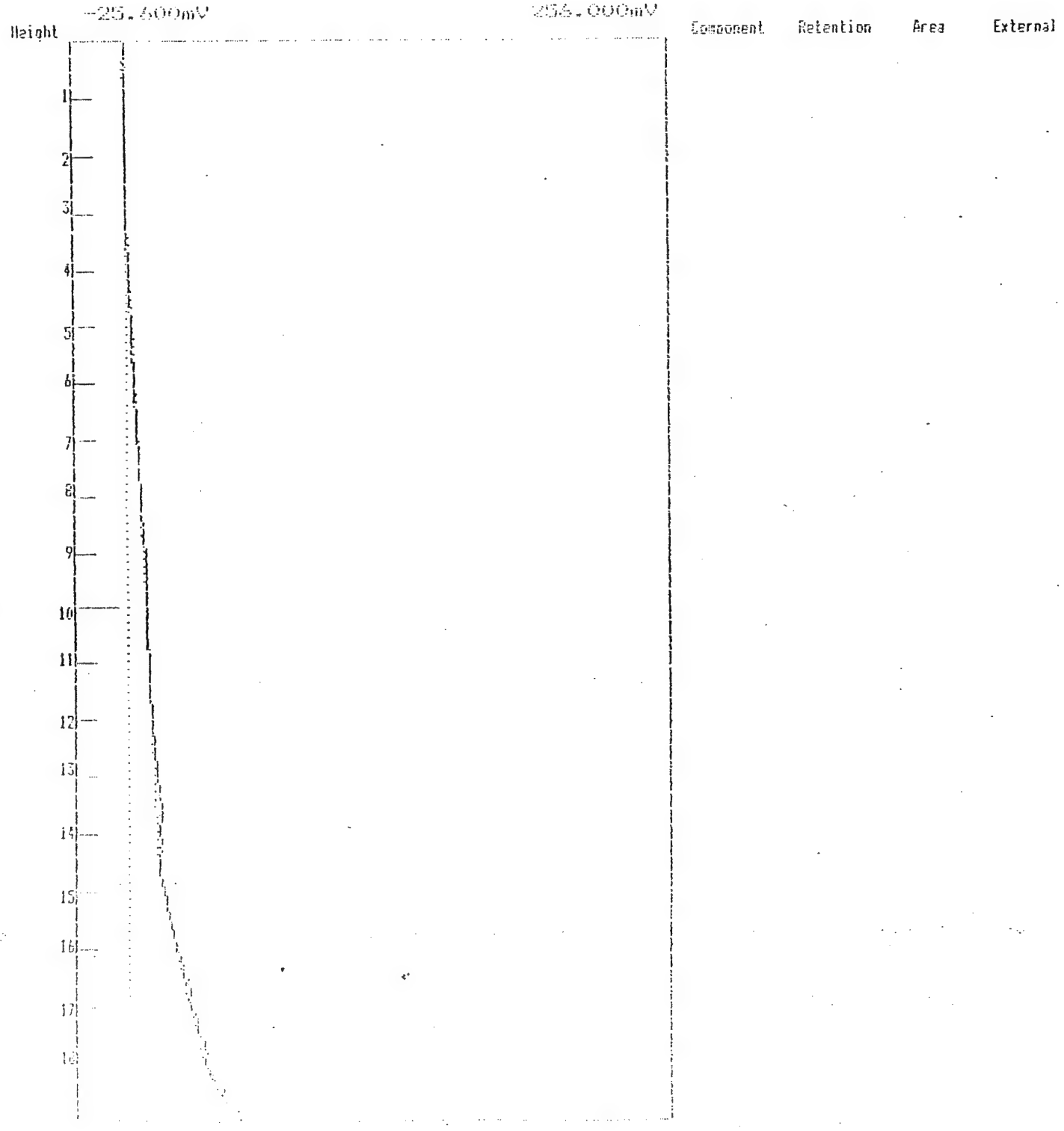
Component	Retention	Area	External
(unknown)	10.183	330.75	N/A
Xylenes	10.550	138.59	15.39
(unknown)	11.150	126.93	N/A

Lab name : ECT Mobile 1
Client : ANEPTEK
Client ID : 01446.L3
Collected : 12/1/94
Holding time : < 24 hrs
Analysis date : 12/01/1994 13:40:51
Method : Direct Injection
Description : ANEPTEK - No. Smithfield
Column : NXT-1 0.53mm x 15 M
Carrier : Nitrogen
Data file : ANEPD6.CHR (c:\chrom\data\aneptek)
Sample : 200 ul vapor
Operator : Andrew Tingley

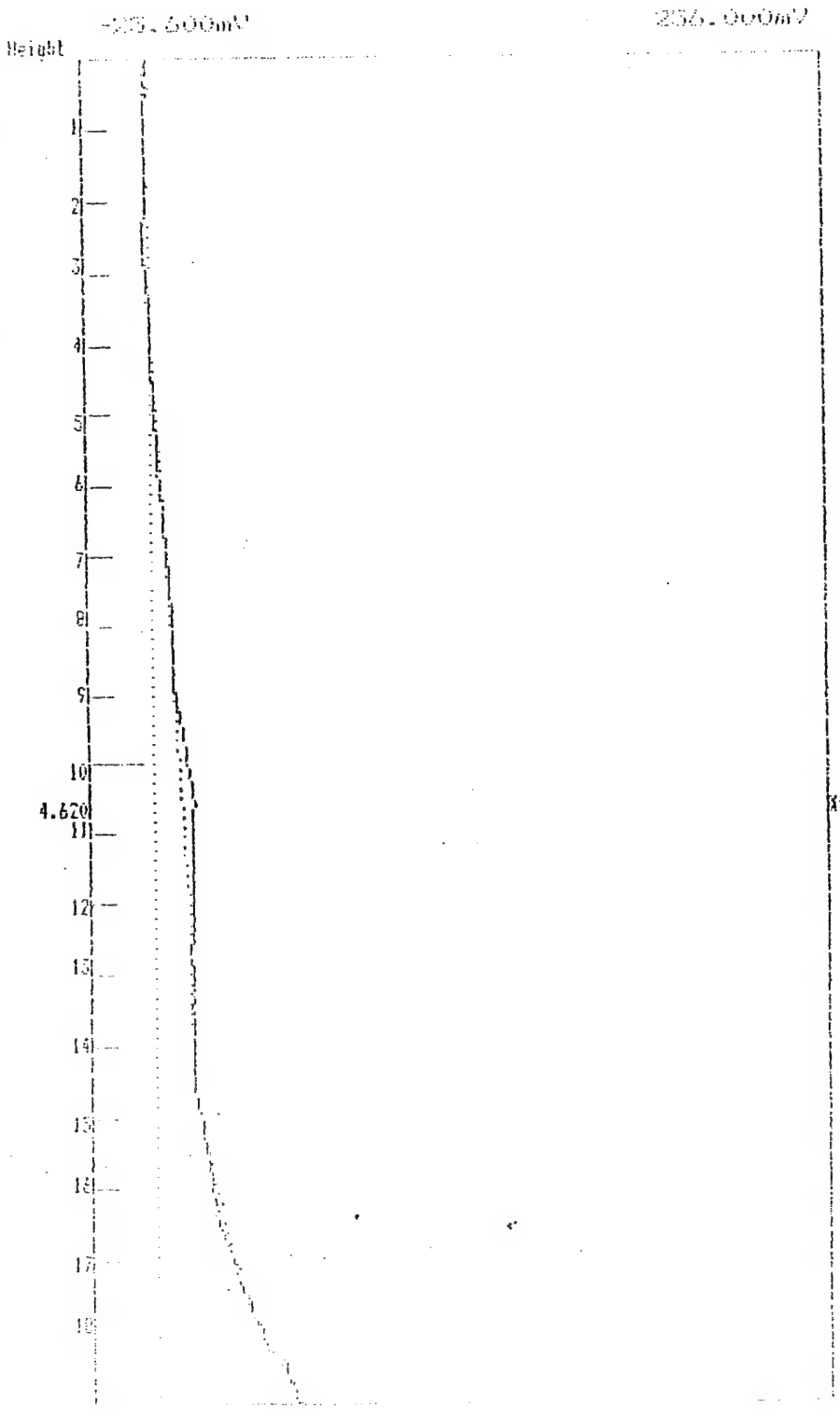


Component	Retention	Area	External
2.560 (unknown)	14.150	112.79	N/A

Lab name : ECT Mobile 1
Client : ANEPTEK
Client ID : 01446.L3
Collected : 12/1/94
Holding time : < 24 hrs
Analysis date : 12/01/1994 15:21:57
Method : Direct Injection
Description : ANEPTEK - No. Smithfield
Column : MXT-1 0.53mm x 15 M
Carrier : Nitrogen
Data file : ANEPD7.CHR (c:\chrom\data\aneptek)
Sample : 200 ul vapor
Operator : Andrew Tingley



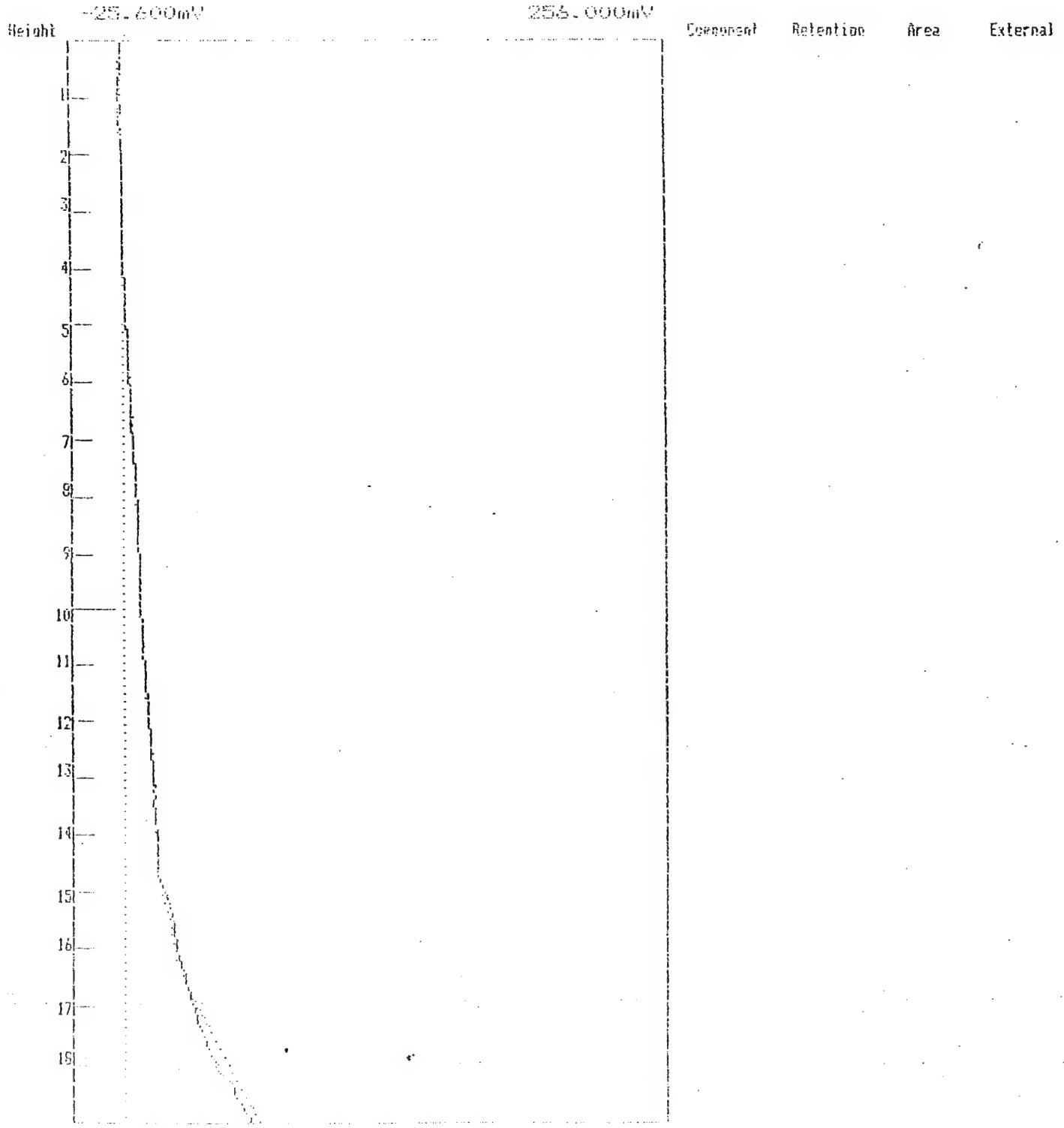
Lab name : ECT Mobile 1
Client : ANEPTEK
Client ID : 01446.L3
Collected : 12/1/94
Holding time : < 24 hrs
Analysis date : 12/01/1994 15:40:12
Method : Direct Injection
Description : ANEPTEK - No. Smithfield
Column : MXT-1 0.53mm x 15 M
Carrier : Nitrogen
Data file : ANEPD8.CHR (c:\chrom\data\anepTek)
Sample : 200 ul vapor
Operator : Andrew Tingley



Component	Retention	Area	External
Xylenel	10.550	350.84	39.92

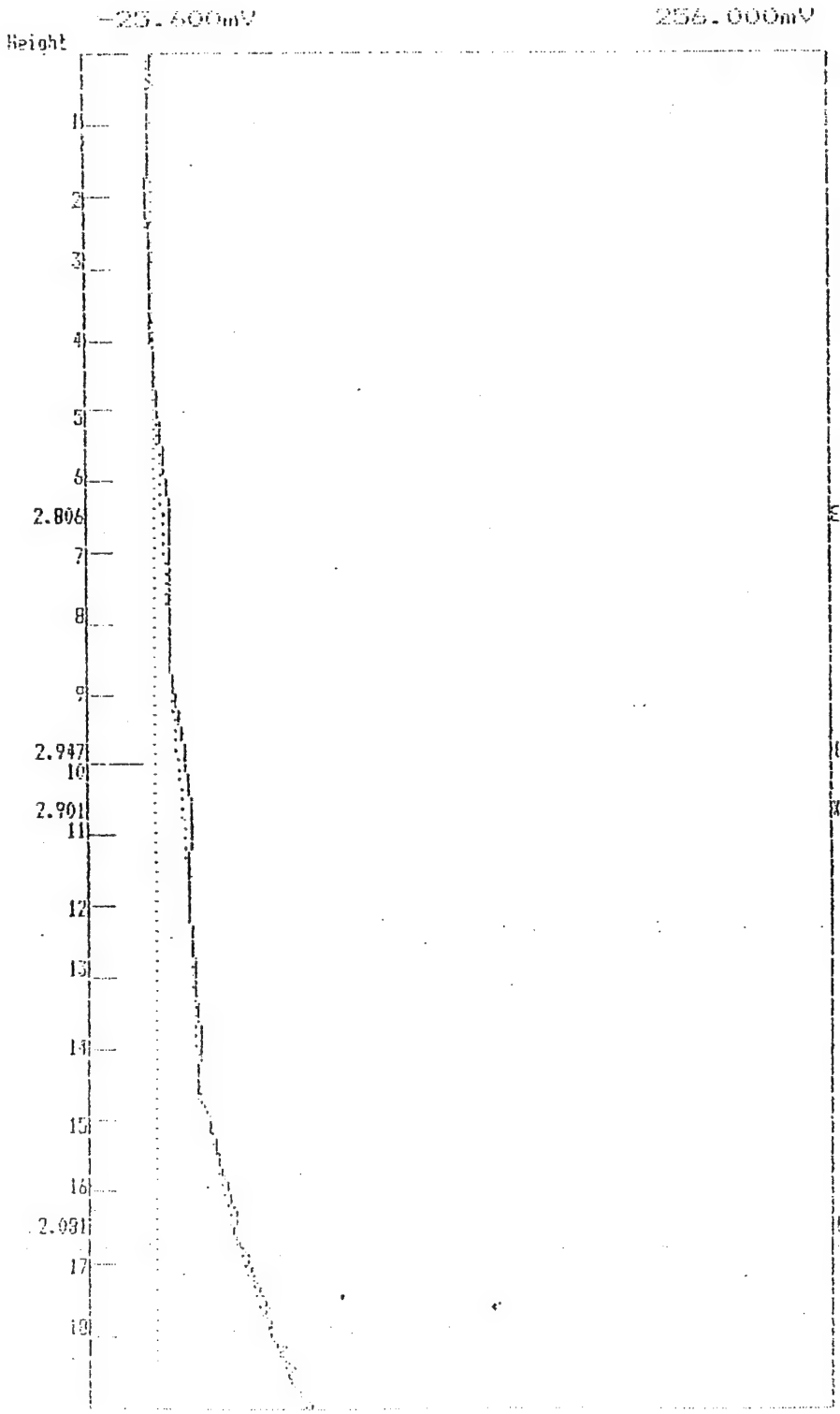
SB-09-02.5

Lab name : ECI Mobile 1
Client : ANEPTEK
Client ID : 01446.L3
Collected : 12/2/94
Holding time : < 24 hrs
Analysis date : 12/02/1994 12:53:10
Method : Direct Injection
Description : ANEPTEK - No. Smithfield
Column : MXT-1 0.53mm x 15 M
Carrier : Nitrogen
Data file : ANEPA11.CHR (c:\chrom\data\aneptek)
Sample : 200 ul vapor
Operator : Andrew Tingley



SB-09-07.5

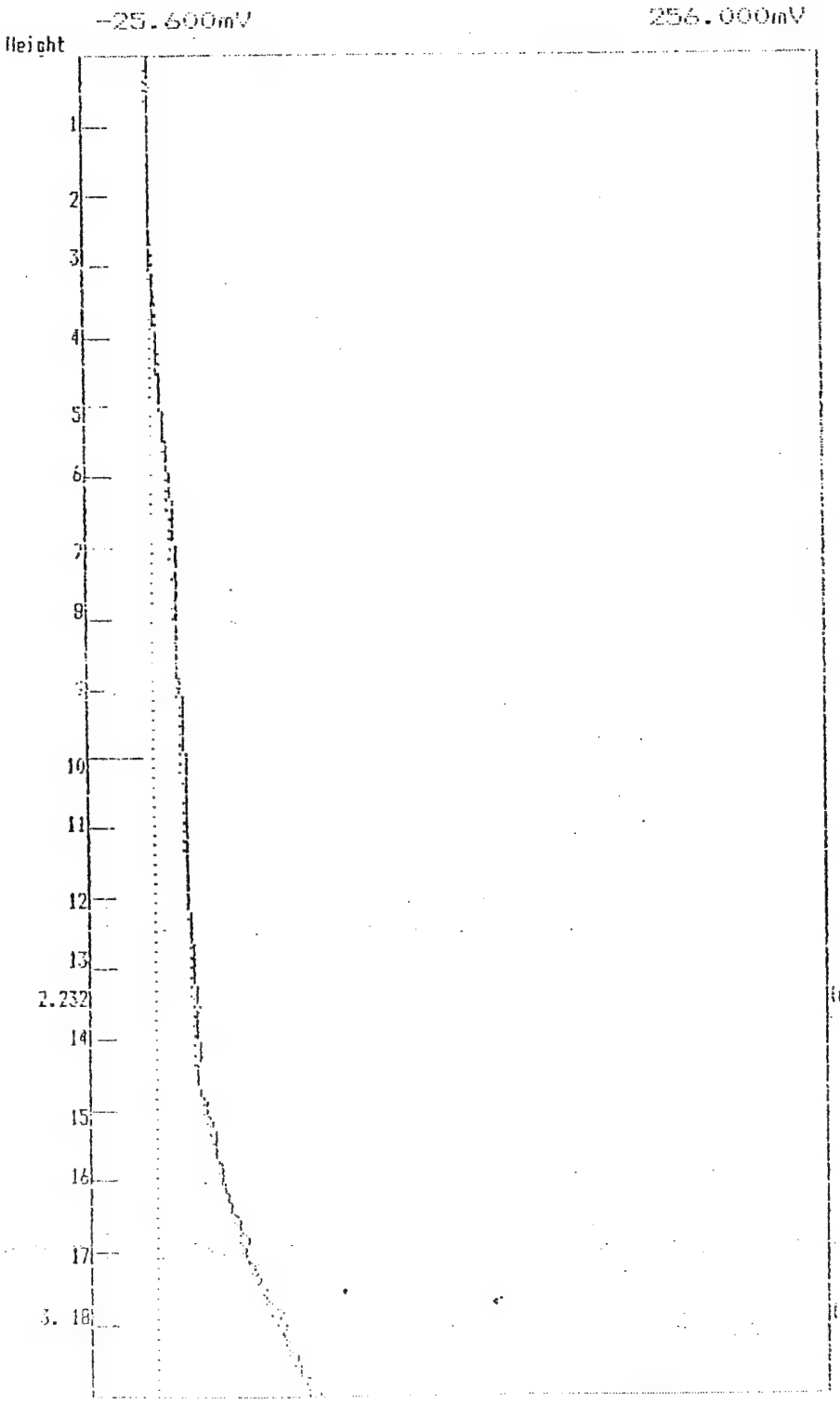
Lab name : ECT Mobile 1
Client : ANEPTEK
Client ID : 01446.L3
Collected : 12/2/94
Holding time : < 24 hrs
Analysis date : 12/02/1994 13:19:09
Method : Direct Injection
Description : ANEPTEK - No. Smithfield
Column : MXT-1 0.53mm x 15 M
Carrier : Nitrogen
Data file : ANEPAI2.CHR (c:\chrom\data\aneptek)
Sample : 200 ui vapor
Operator : Andrew Tingley



Component	Retention	Area	External
Ethyl Benzene	6.400	147.44	14.46
(unknown)	9.933	130.20	N/A
Xylenes	10.583	109.18	12.13
(unknown)	16.400	102.84	N/A

SB-09-12

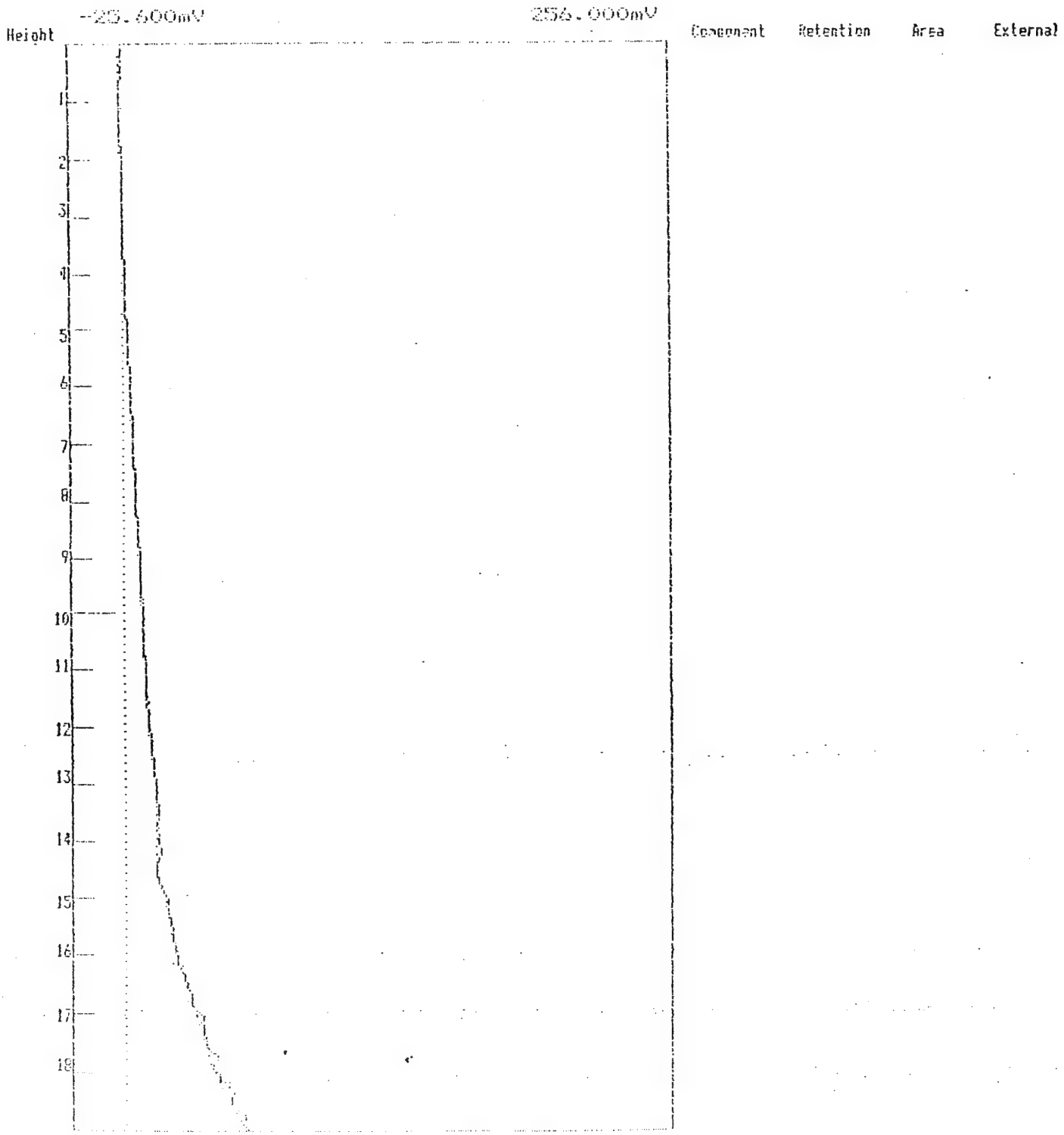
Lab name : ELI Mobile 1
Client : ANEPTEK
Client ID : 01446.L3
Collected : 12/2/94
Holding time : < 24 hrs
Analysis date : 12/02/1994 13:53:32
Method : Direct Injection
Description : ANEPTEK - No. Smithfield
Column : MXT-1 0.53mm x 15 M
Carrier : Nitrogen
Data file : ANEPAI3.CHR (c:\chrom\data\aneptek)
Sample : 200 ul vapor
Operator : Andrew Tingley



Component	Retention	Area	External
(unknown)	13.566	119.95	N/A
(unknown)	18.016	118.45	N/A

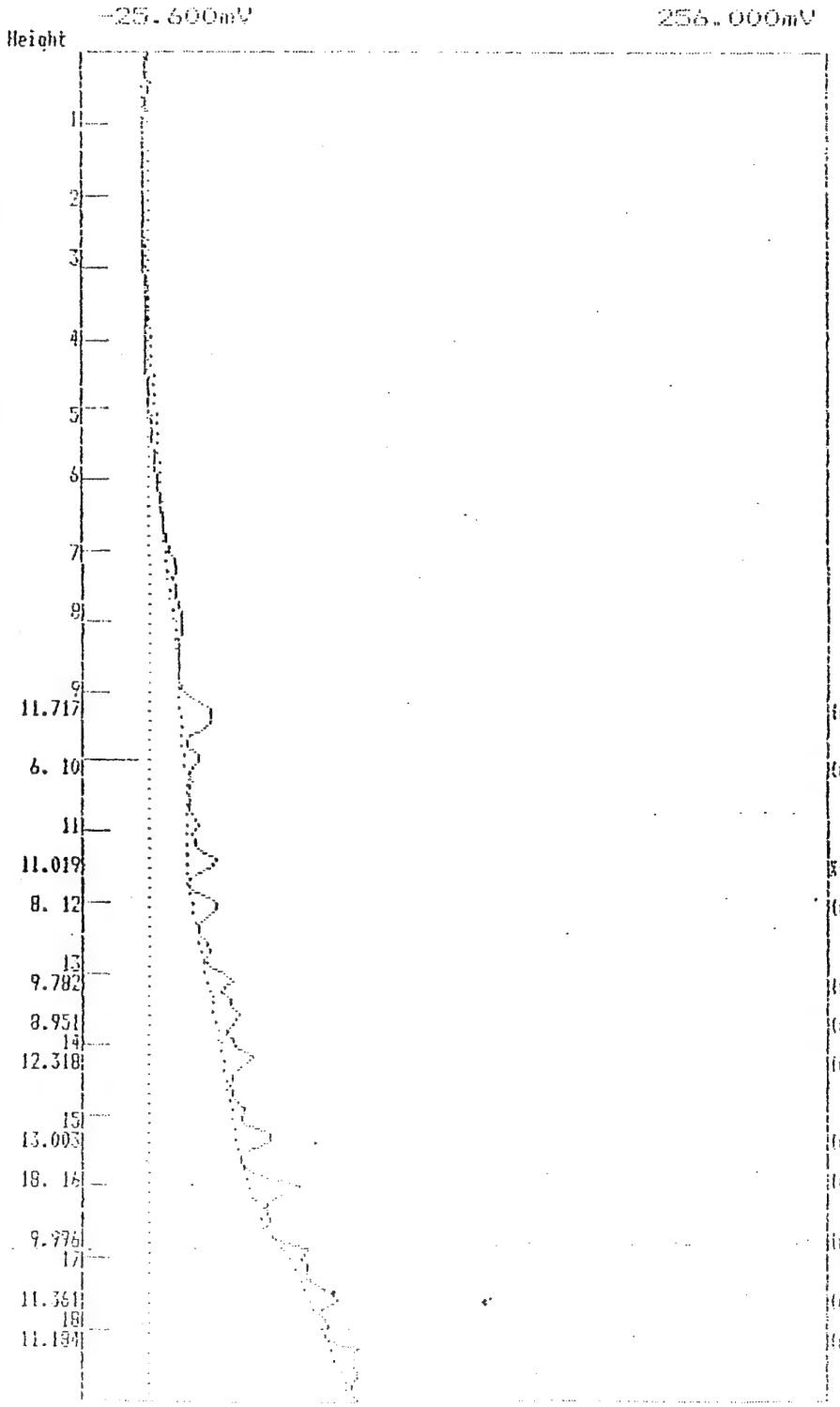
SB-10-02

Lab name : EGI Mobile 1
Client : ANEPTEK
Client ID : 01446.L3
Collected : 12/2/94
Holding time : < 24 hrs
Analysis date : 12/02/1994 15:00:47
Method : Direct Injection
Description : ANEPTEK - No. Smithfield
Column : MXT-1 0.53mm x 15 M
Carrier : Nitrogen
Data file : ANEPAI4.CHR (c:\chrom\data\aneptek)
Sample : 200 ul vapor
Operator : Andrew Tingley



SB-10-04

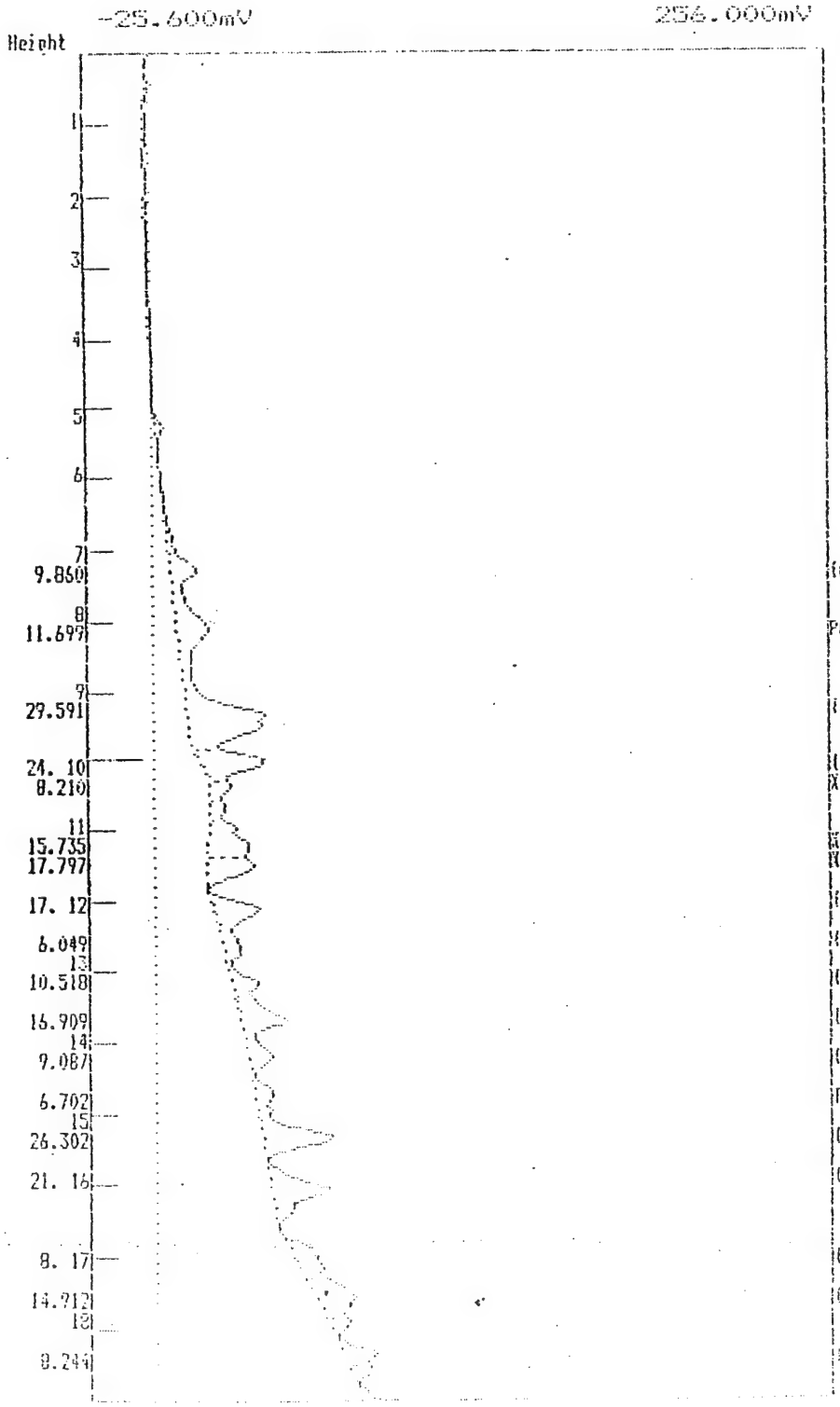
Lab name : ECI Mobile 1
Client : ANEPTEK
Client ID : 01446.L3
Collected : 12/2/94
Holding time : < 24 hrs
Analysis date : 12/02/1994 15:26:04
Method : Direct Injection
Description : ANEPTEK - No. Smithfield
Column : MXT-1 0.53mm x 15 M
Carrier : Nitrogen
Data file : ANEPA15.CHR (c:\chrom\data\aneptek)
Sample : 200 ul vapor
Operator : Andrew Tingley



Component	Retention	Area	External
(unknown)	9.316	349.13	N/A
(unknown)	9.966	108.68	N/A
Xylene3	11.416	217.59	21.77
(unknown)	12.066	189.45	N/A
(unknown)	13.100	149.24	N/A
(unknown)	13.616	235.76	N/A
(unknown)	14.166	270.60	N/A
(unknown)	15.350	251.82	N/A
(unknown)	16.033	323.84	N/A
(unknown)	16.900	110.41	N/A
(unknown)	17.583	196.84	N/A
(unknown)	18.266	100.07	N/A

SB-10-06

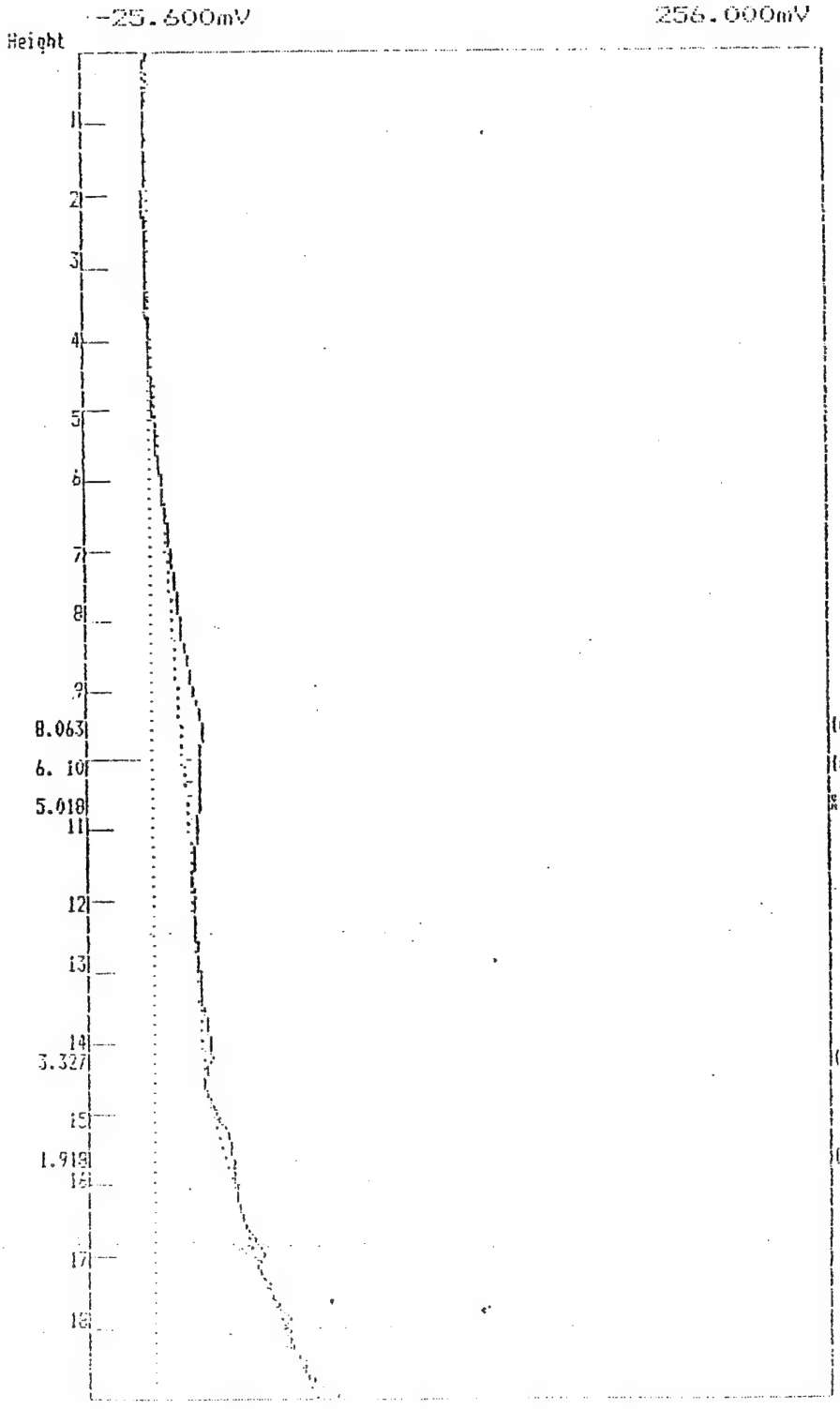
Lab name : ECT Mobile 1
Client : ANEPTEK
Client ID : 01446.L3
Collected : 12/2/94
Holding time : < 24 hrs
Analysis date : 12/02/1994 15:51:35
Method : Direct Injection
Description : ANEPTEK - No. Smithfield
Column : MXT-1 0.53mm x 15 M
Carrier : Nitrogen
Data file : ANEPA16.CHR (c:\chrom\data\aneptek)
Sample : 200 ul vapor
Operator : Andrew Tingley



Component	Retention	Area	External
(unknown)	7.283	240.22	N/A
PCE	9.133	435.57	87.23
(unknown)	9.350	1008.78	N/A
(unknown)	10.016	449.63	N/A
Xylene1	10.366	112.05	12.45
Xylene3	11.233	358.19	35.00
Xylene3	11.500	325.41	31.91
(unknown)	12.116	330.28	N/A
(unknown)	12.733	134.81	N/A
(unknown)	13.183	144.20	N/A
(unknown)	13.716	366.67	N/A
(unknown)	14.233	174.50	N/A
Tri Me Benzene	14.766	111.06	0.02
(unknown)	15.350	507.39	N/A
(unknown)	16.066	467.40	N/A
(unknown)	17.166	206.83	N/A
(unknown)	17.566	365.56	N/A
(unknown)	18.566	102.22	N/A

SB-10-08

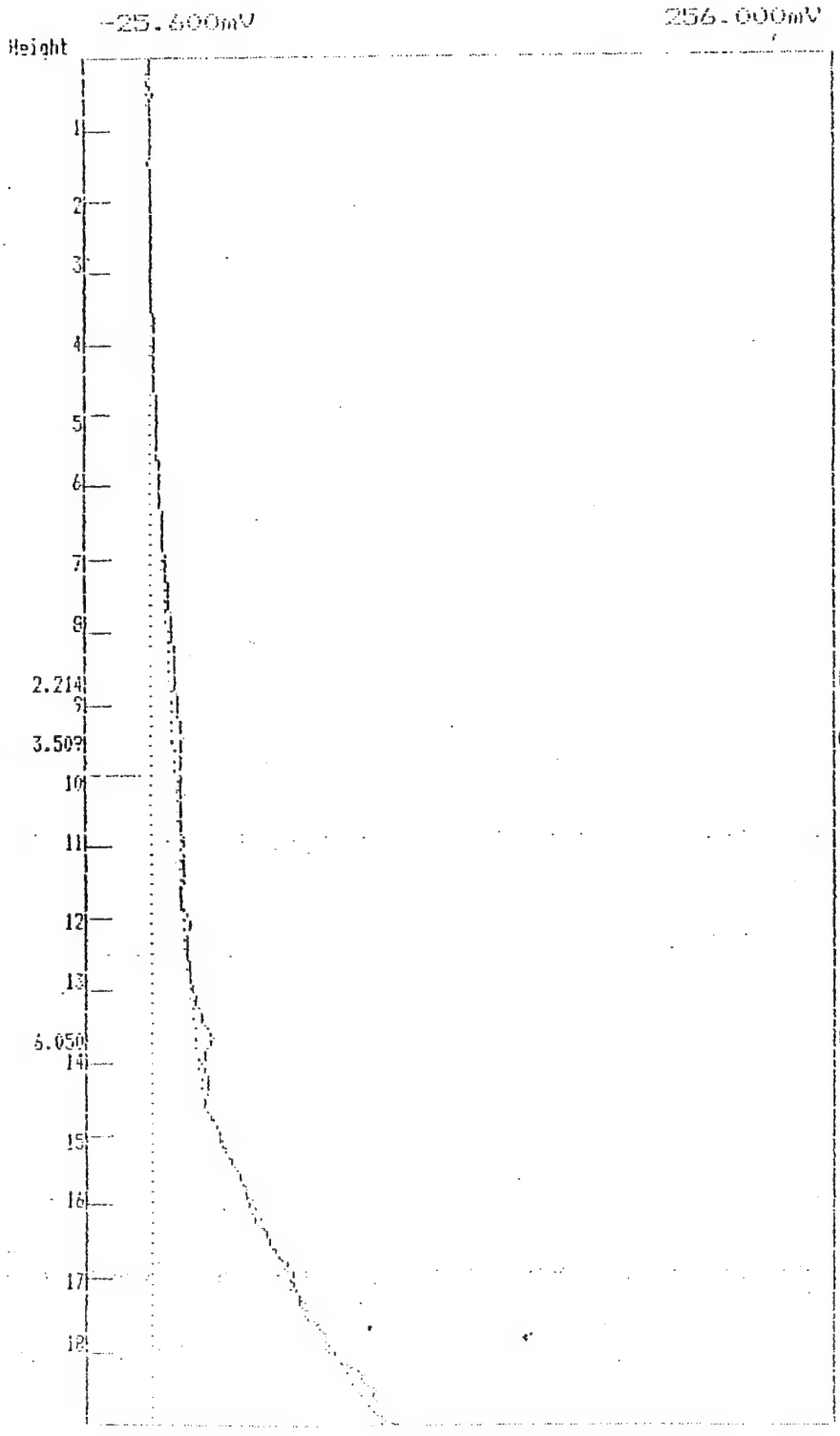
Lab name : ECT Mobile 1
Client : ANEPTEK
Client ID : 01446.L3
Collected : 12/2/94
Holding time : < 24 hrs
Analysis date : 12/02/1994 16:18:10
Method : Direct Injection
Description : ANEPTEK - No. Smithfield
Column : MXT-1 0.53mm x 15 M
Carrier : Nitrogen
Data file : ANEPA17.CHR (c:\chrom\data\aneptek)
Sample : 200 ul vapor
Operator : Andrew Tingley



Component	Retention	Area	External
(unknown)	9.566	677.83	N/A
(unknown)	10.100	124.78	N/A
Xylenel	10.533	136.00	15.11
(unknown)	14.233	147.90	N/A
(unknown)	15.750	127.92	N/A

SB-11-02

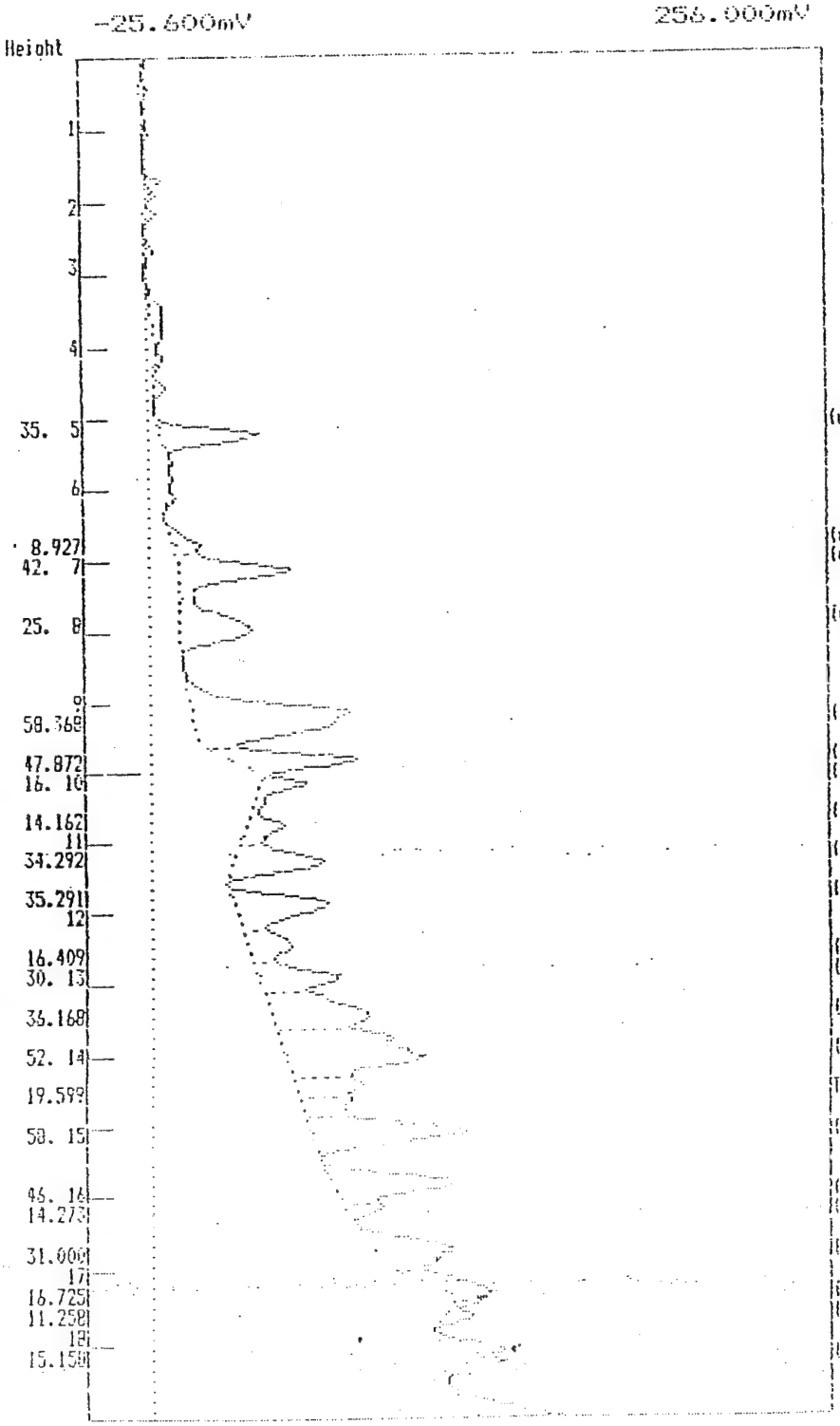
Lab name : ECI Mobile 1
Client : ANEPTEK
Client ID : 01446.L3
Collected : 12/5/94
Holding time : < 24 hrs
Analysis date : 12/05/1994 13:00:03
Method : Direct Injection
Description : ANEPTEK - No. Smithfield
Column : MXT-1 0.53mm x 15 M
Carrier : Nitrogen
Data file : ANEPA22.CHR (c:\chrom\data\aneptek)
Sample : 200 ul vapor
Operator : Andrew Tingley



Component	Retention	Area	External
(unknown)	8.616	144.80	N/A
(unknown)	9.483	164.92	N/A
(unknown)	13.683	194.07	N/A

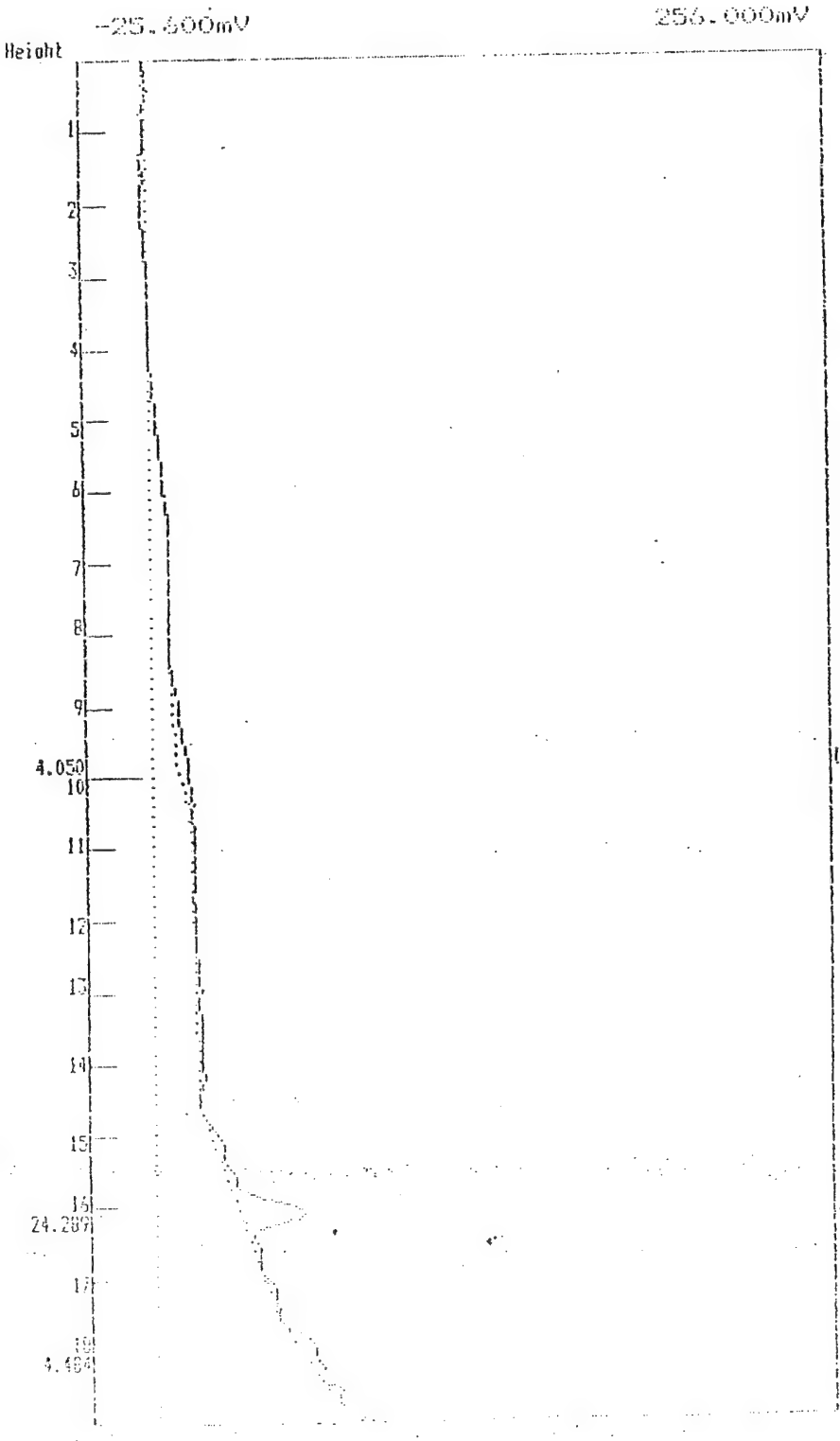
SB-11-07

Lab name : [illegible]
Client : ANEPTEK
Client ID : 01446.L3
Collected : 12/5/94
Holding time : < 24 hrs
Analysis date : 12/05/1994 13:26:28
Method : Direct Injection
Description : ANEPTEK - No. Smithfield
Column : MXT-1 0.53mm x 15 M
Carrier : Nitrogen
Data file : ANEPA23.CHR (c:\chrom\data\aneptek)
Sample : 200 ul vapor
Operator : Andrew Tingley



Component	Retention	Area	External
(unknown)	5.216	487.01	N/A
(unknown)	6.783	118.79	N/A
(unknown)	7.133	723.57	N/A
(unknown)	7.983	687.01	N/A
(unknown)	9.166	1682.25	N/A
(unknown)	9.800	685.86	N/A
(unknown)	10.150	218.28	N/A
(unknown)	10.750	239.93	N/A
(unknown)	11.300	643.56	N/A
(unknown)	11.900	737.20	N/A
(unknown)	12.483	330.50	N/A
(unknown)	12.883	508.85	N/A
(unknown)	13.483	860.25	N/A
(unknown)	14.016	1594.30	N/A
Tri Me Benzene	14.633	272.46	0.04
(unknown)	15.083	1075.02	N/A
(unknown)	15.816	810.91	N/A
(unknown)	16.133	162.51	N/A
(unknown)	16.733	616.98	N/A
(unknown)	17.316	362.60	N/A
(unknown)	17.600	113.40	N/A
(unknown)	18.250	158.85	N/A

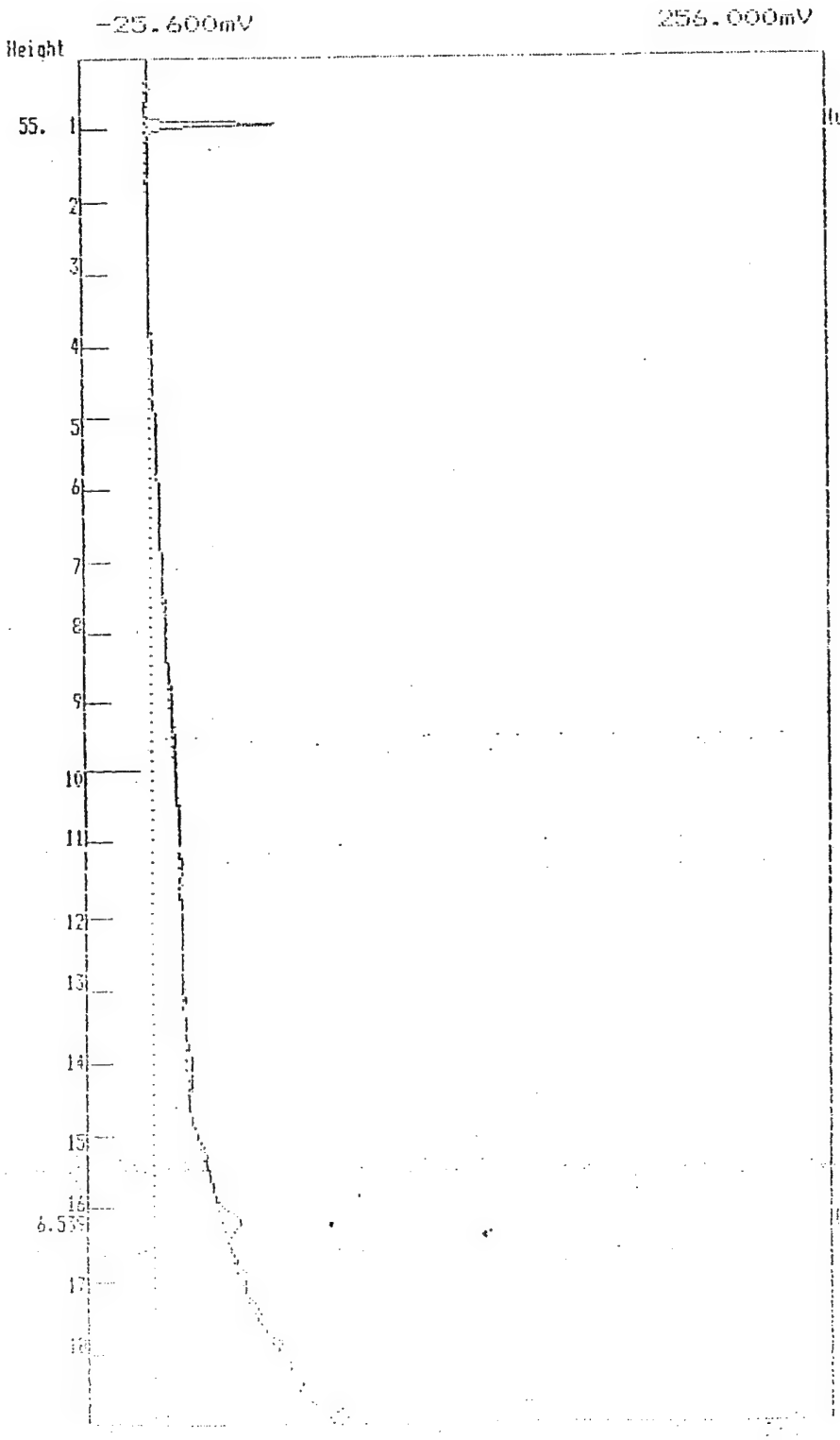
Lab name : ECI Mobile 1
Client : ANEPTEK
Client ID : 01446.L3
Collected : 12/5/94
Holding time : < 24 hrs
Analysis date : 12/05/1994 13:51:55
Method : Direct Injection
Description : ANEPTEK - No. Smithfield
Column : MXT-1 0.53mm x 15 M
Carrier : Nitrogen
Data file : ANEPA24.CHR (c:\chrom\data\aneptek)
Sample : 200 ul vapor
Operator : Andrew Tingley



Component	Retention	Area	External
(unknown)	9.766	180.58	N/A
(unknown)	16.190	576.07	N/A
(unknown)	18.233	177.01	N/A

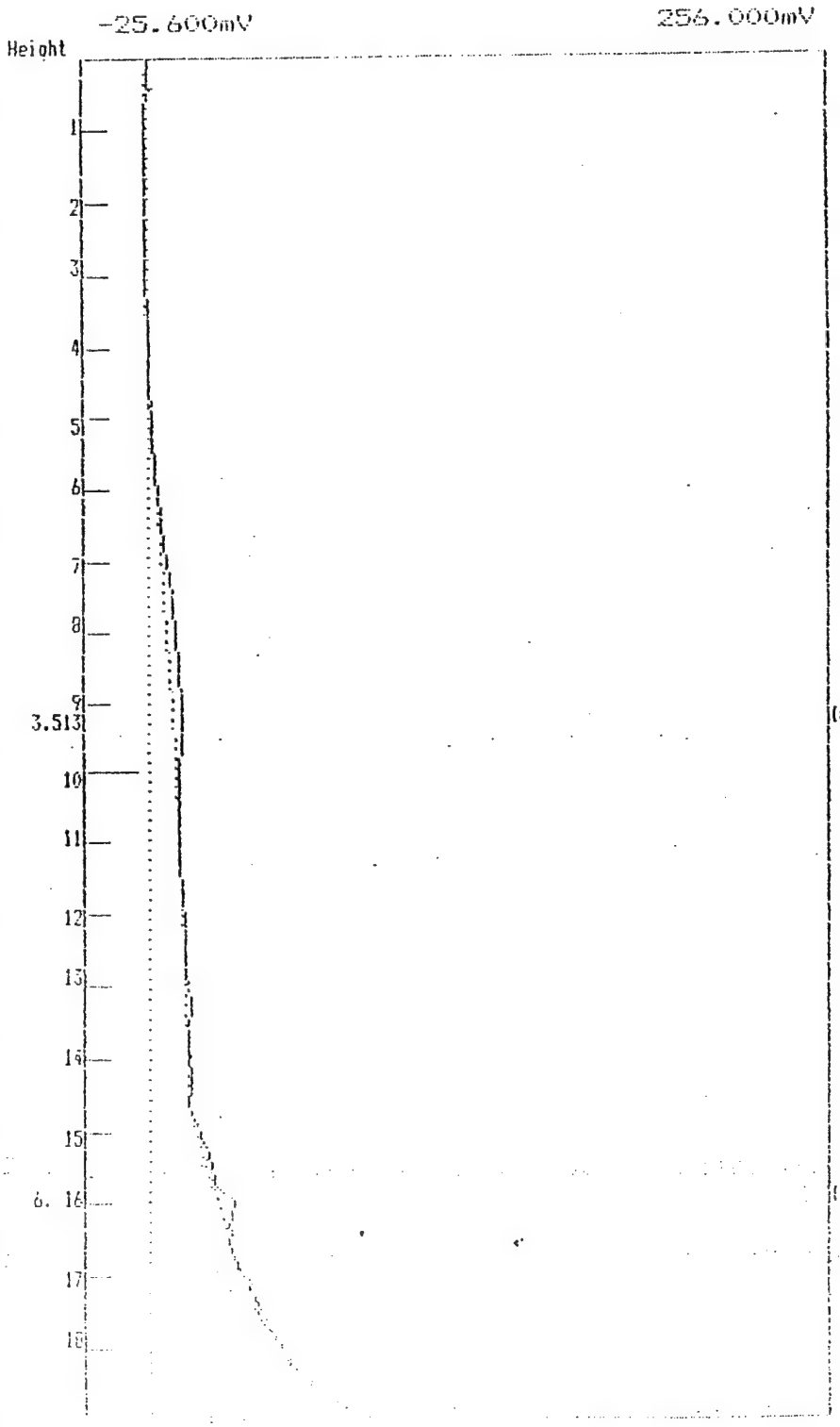
SB-12-02

Lab name : ECT Mobile 1
Client : ANEPTEK
Client ID : 01446.L3
Collected : 12/5/94
Holding time : < 24 hrs
Analysis date : 12/05/1994 15:30:52
Method : Direct Injection
Description : ANEPTEK - No. Smithfield
Column : MXT-1 0.53mm x 15 M
Carrier : Nitrogen
Data file : ANEPA26.CHR (c:\chrom\data\aneptek)
Sample : 200 ul vapor
Operator : Andrew Tingley



Component	Retention	Area	External
(unknown)	0.916	253.62	N/A
(unknown)	16.183	138.01	N/A

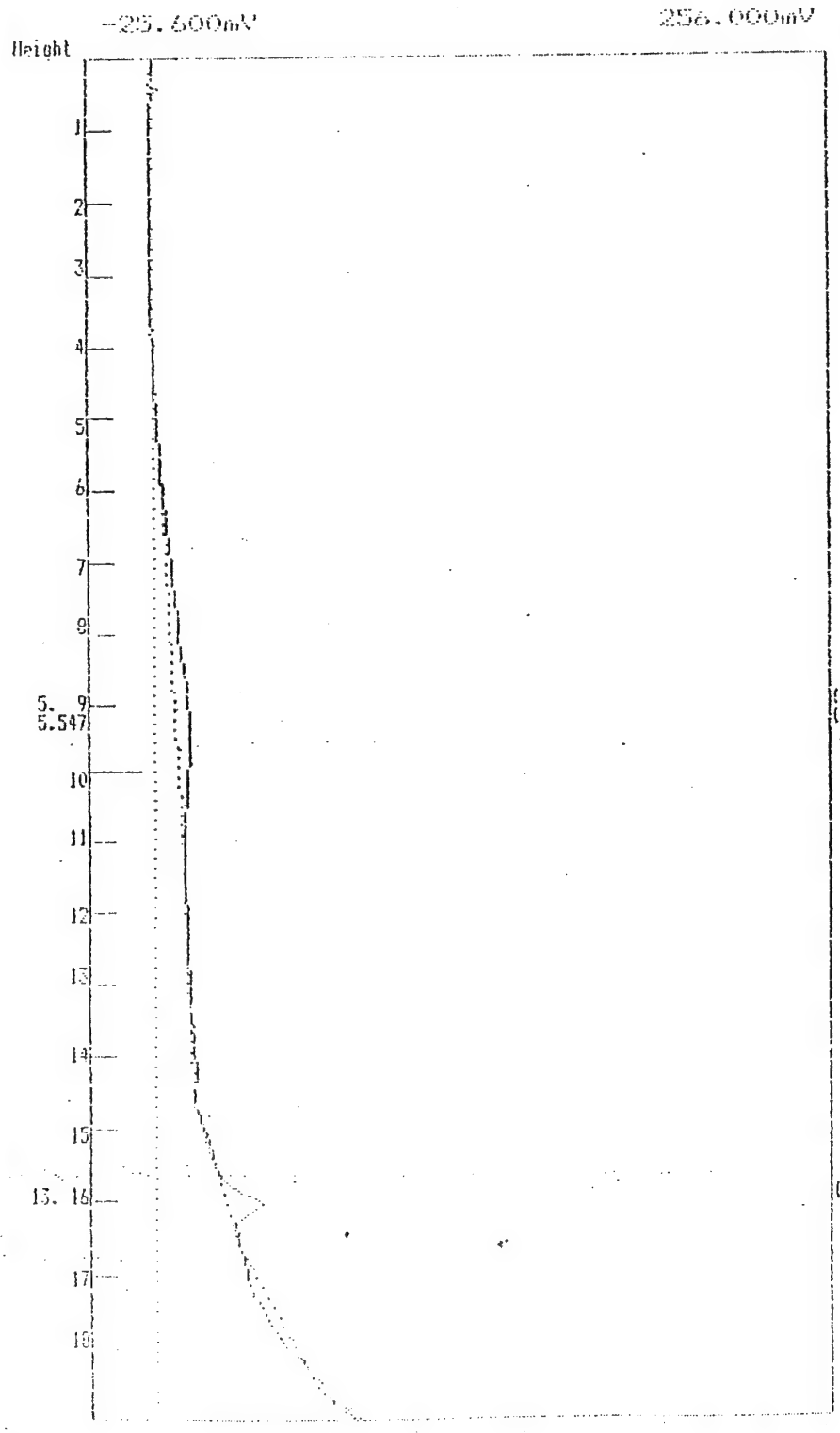
Lab name : ECT Mobile 1
Client : ANEPTEK
Client ID : 01446.L3
Collected : 12/5/94
Holding time : < 24 hrs
Analysis date : 12/05/1994 15:56:26
Method : Direct Injection
Description : ANEPTEK - No. Smithfield
Column : MXT-1 0.53mm x 15 M
Carrier : Nitrogen
Data file : ANEPA27.CHR (c:\chrom\data\aneptek)
Sample : 200 ul vapor
Operator : Andrew Tingley



Component	Retention	Area	External
(unknown)	9.166	504.79	N/A
(unknown)	15.983	205.50	N/A

SB-12-12

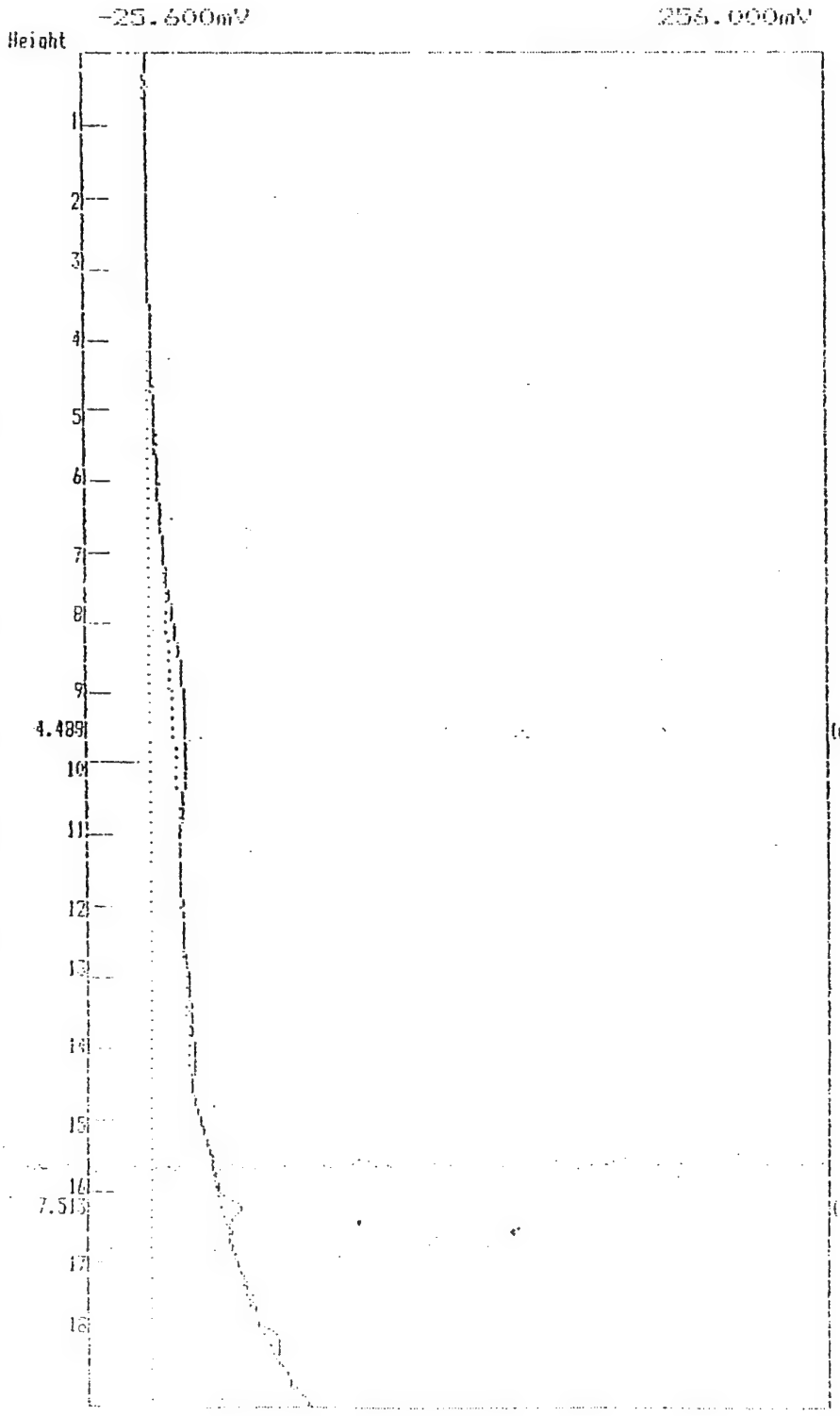
Lab name : ECT Mobile 1
Client : ANEPTEK
Client ID : 01446.L3
Collected : 12/5/94
Holding time : < 24 hrs
Analysis date : 12/05/1994 16:22:22
Method : Direct Injection
Description : ANEPTEK - No. Smithfield
Column : MXT-1 0.53mm x 15 M
Carrier : Nitrogen
Data file : ANEPA28.CHR (c:\chrom\data\aneptek)
Sample : 200 ul vapor
Operator : Andrew Tingley



Component	Retention	Area	External
(unknown)	8.950	462.94	N/A
(unknown)	9.366	356.61	N/A
(unknown)	16.066	275.46	N/A

SB-13-02.5

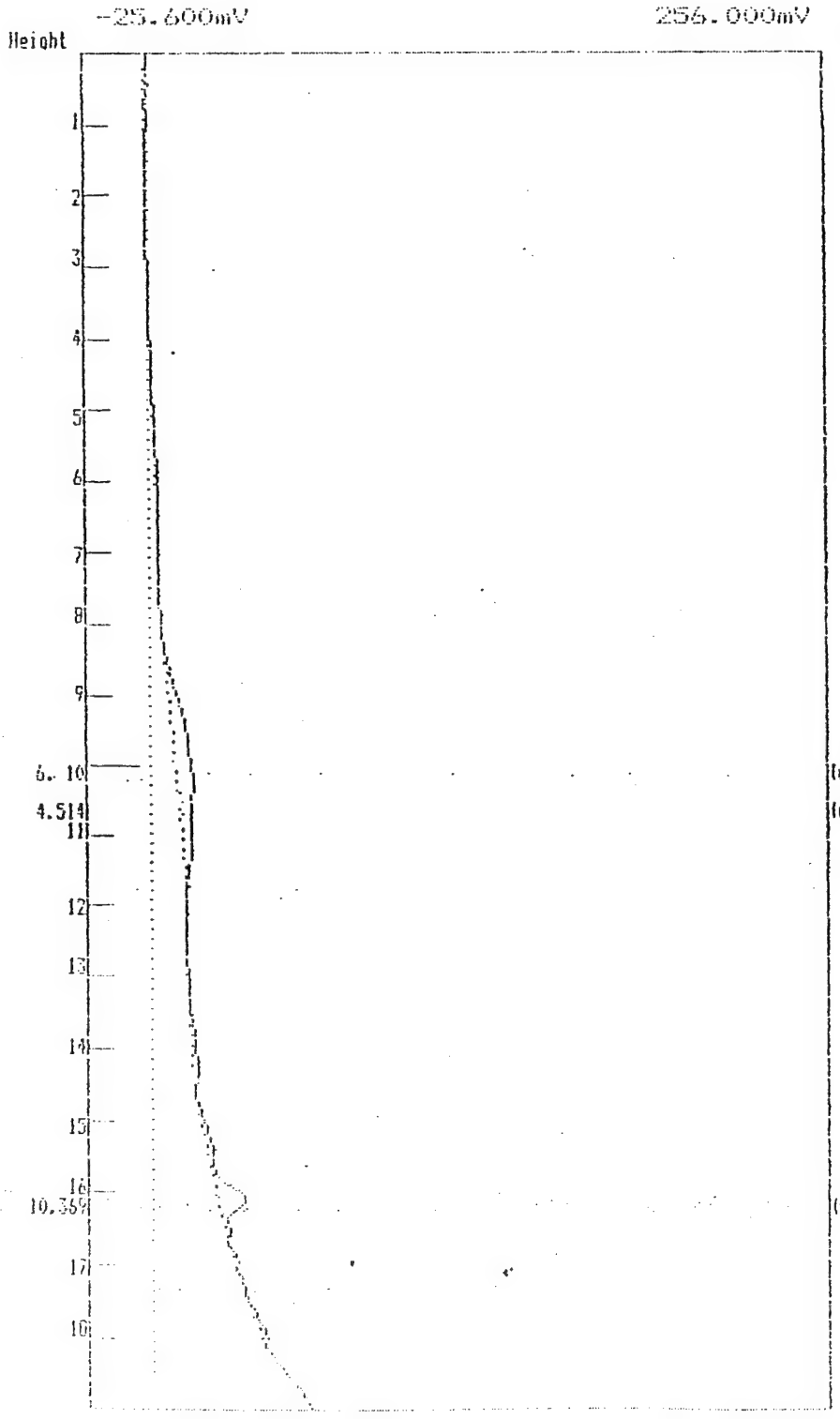
Lab name : ECT Mobile 1
Client : ANEPTEK
Client ID : 01446.L3
Collected : 12/6/94
Holding time : < 24 hrs
Analysis date : 12/06/1994 11:37:08
Method : Direct Injection
Description : ANEPTEK - No. Smithfield
Column : MXT-1 0.53mm x 15 M
Carrier : Nitrogen
Data file : ANEPA33.CHR (c:\chrom\data\aneptek)
Sample : 200 ul vapor
Operator : Andrew Tingley



Component	Retention	Area	External
(unknown)	9.583	507.57	N/A
(unknown)	16.233	166.59	N/A

SB-13-07

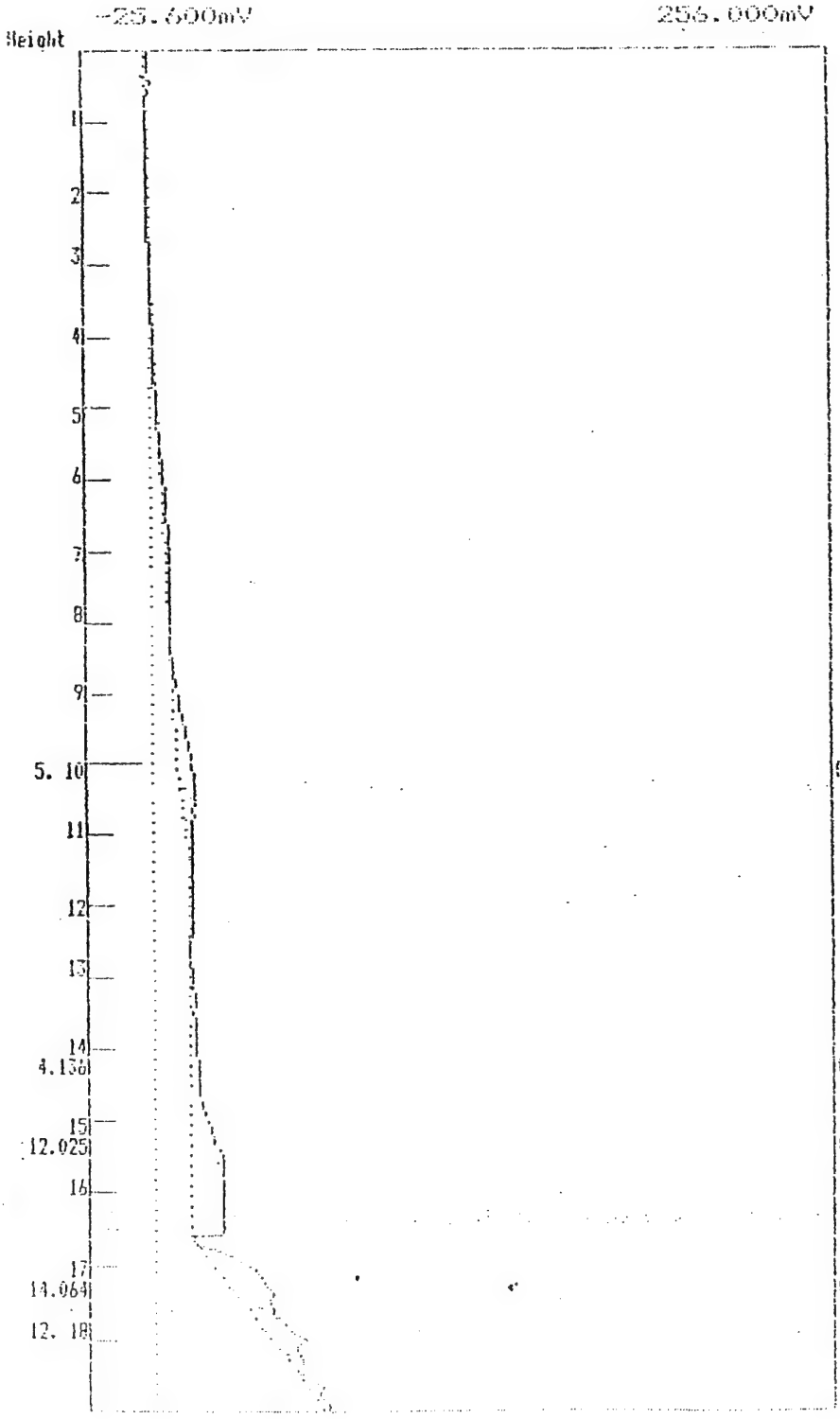
Lab name : ECT Mobile 1
Client : ANEPTEK
Client ID : 01446.L3
Collected : 12/6/94
Holding time : < 24 hrs
Analysis date : 12/06/1994 12:02:22
Method : Direct Injection
Description : ANEPTEK - No. Smithfield
Column : MXT-1 0.53mm x 15 M
Carrier : Nitrogen
Data file : ANEPA34.CHR (c:\chrom\data\aneptek)
Sample : 200 ul vapor
Operator : Andrew Tingley



Component	Retention	Area	External
(unknown)	10.200	515.93	N/A
(unknown)	10.766	102.97	N/A
(unknown)	16.100	308.06	N/A

SB-13-10.5

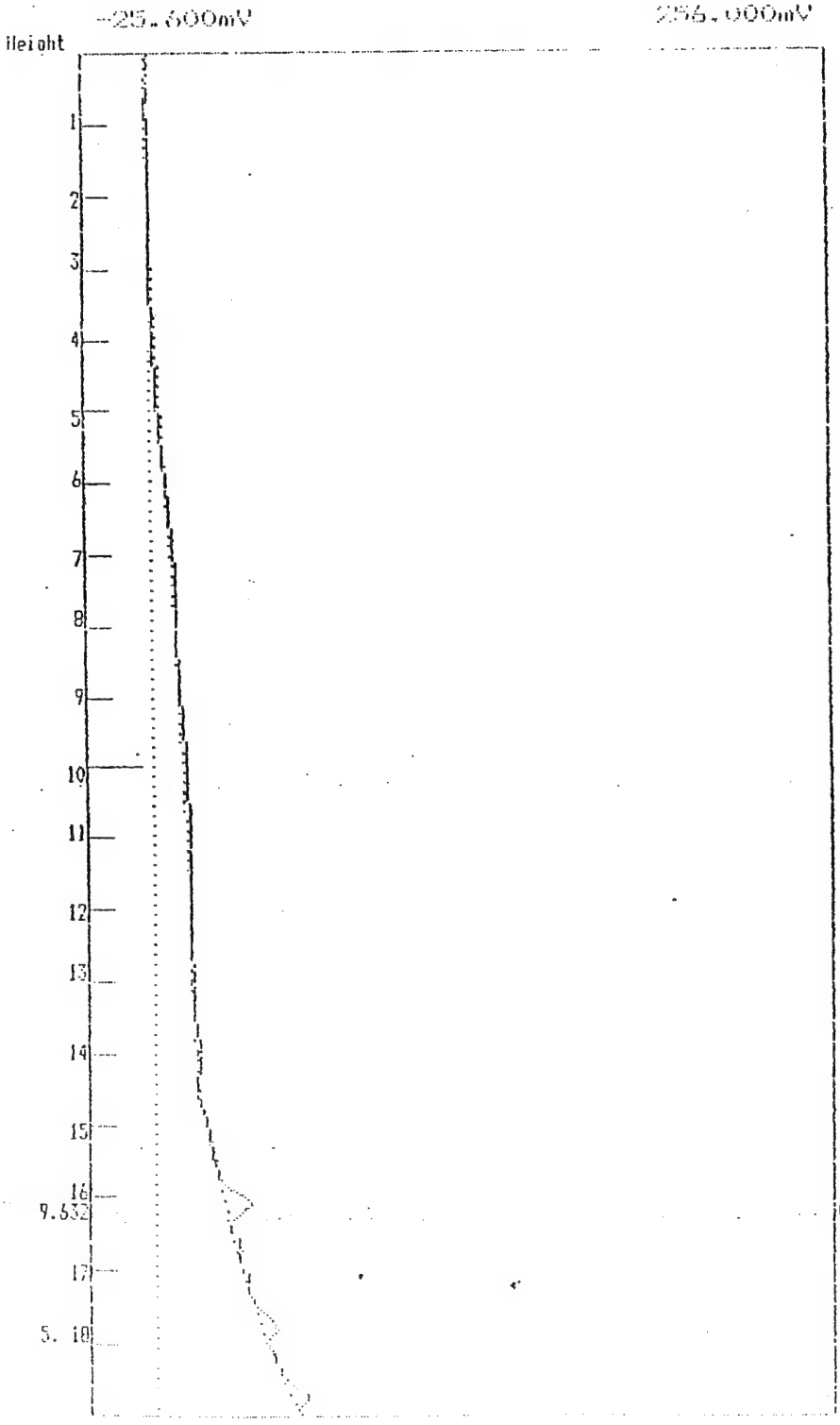
Lab name : ECT Mobile 1
Client : ANEPTEK
Client ID : 01446.L3
Collected : 12/6/94
Holding time : < 24 hrs
Analysis date : 12/06/1994 12:27:51
Method : Direct Injection
Description : ANEPTEK - No. Smithfield
Column : MXT-1 0.53mm x 15 M
Carrier : Nitrogen
Data file : ANEPA35.CHR (c:\chrom\data\aneptek)
Sample : 200 ul vapor
Operator : Andrew Tingley



Component	Retention	Area	External
(unknown)	10.200	327.94	N/A
(unknown)	14.400	198.69	N/A
(unknown)	15.466	1170.71	N/A
(unknown)	17.400	552.10	N/A
(unknown)	18.000	360.64	N/A

SB-14-02.5

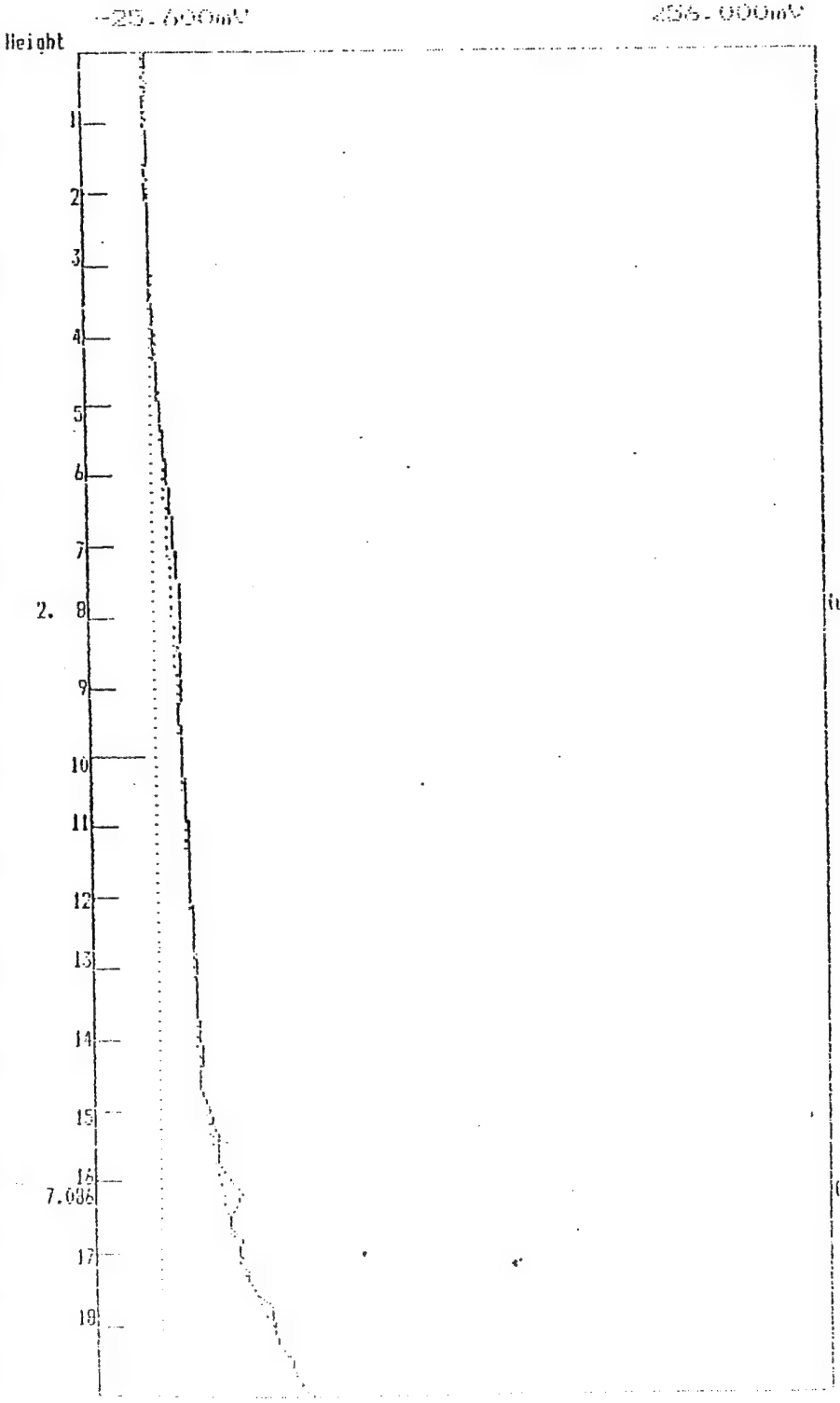
Lab name : ECT Mobile 1
Client : ANEPTEK
Client ID : 01496.L3
Collected : 12/6/94
Holding time : < 24 hrs
Analysis date : 12/06/1994 12:56:21
Method : Direct Injection
Description : ANEPTEK - No. Smithfield
Column : MXT-1 0.53mm x 15 M
Carrier : Nitrogen
Data file : ANEPA36.CHR (c:\chrom\data\aneptek)
Sample : 200 ul vapor
Operator : Andrew Tingley



Component	Retention	Area	External
(unknown)	16.083	151.18	N/A
(unknown)	17.316	102.56	N/A

SB-14-07

Lab name : ECT Mobile 1
Client : ANEPTEK
Client ID : 01446.L3
Collected : 12/6/94
Holding time : < 24 hrs
Analysis date : 12/06/1994 13:27:28
Method : Direct Injection
Description : ANEPTEK - No. Smithfield
Column : MXT-1 0.53mm x 15 M
Carrier : Nitrogen
Data file : ANEPA37.CHR (c:\chrom\data\aneptek)
Sample : 200 ul vapor
Operator : Andrew Tingley



Component	Retention	Area	External
(unknown)	7.950	276.62	N/A
(unknown)	16.183	188.70	N/A

APPENDIX C

SOIL BORING/MONITORING WELL LOGS

ANEPTEK CORPORATION

BORING LOG

Sheet 1 of 1

Boring No. SB-01

PROJECT North Smithfield ANGS
JOB NO. 94110.32
CONTRACTOR
DRILLER Seaboard
CONSULTANT Hager GeoScience, Inc.
LOGGED BY J. Hager

DATE 11/29/94
TIMES 10:50 a.m. - 12:10 p.m.
DRILL RIG TYPE HSA (4.25") Mobil B-53
WEATHER/TEMP. clear, sunny/50's
DEPTH TO WATER TABLE 7.5 * FT.

LOCATION N. Smithfield Air National Guard, North Smithfield, RI
GROUND SURFACE ELEVATION
COMMENTS continuous sampling in AOC B

DEPTH BELOW GRADE (FT.)	SAMPLING (SPT) BLOWS PER 6"	PEN	REC	TYPE	SAMPLE DESCRIPTION	HNU
1	2 4	24"	17"	SPT	Moist, brown, fine to coarse sand, little to some silt, trace coarse to fine gravel.	
2	3 8					HNU - 0ppm
3	11 28	20"	13"	SPT	Top 3": As above. Lower 10": Moist, very dense, gray fine sand, trace silt, trace coarse to fine gravel.	
4	110 100/2"					HNU - 0ppm
5	10 19	24"	9"	SPT	Moist, dense, gray fine sand, trace coarse to medium sand, trace silt, trace fine to coarse gravel.	
6	20 15					
7	20 10	24"	13"	SPT	Moist, medium dense gray fine sand, trace coarse to medium sand, trace silt, trace coarse to fine gravel.	
8	6 8					
9	9/5" 100/0"	5"	0"	SPT	No recovery. Wet, gray sand and silt on outside of spoon.	HNU - 0ppm
10						
11					Refusal at 8.4' with both spoon and augers.	
12					End of boring at 8.4' grouted to surface.	
13					Note: augered through gravel and cobbles beginning at ~3'.	
14						
15						
16						
17						
18						
19						
20						

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT.	DENSITY	BLOWS/FT.	DENSITY
<4	V. LOOSE	<2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
>50	V. DENSE	15-30	V. STIFF
		>50	HARD

(SPT)
Standard Penetration Test= 140 lb. weight falling 30" onto a two foot long 2" O.D. split spoon sampler

PEN - Penetrated
REC - Recovered
HSA - Hollow-Stem Auger
SS - Split Spoon
PID - Photoionization Detector

PROPORTIONS
Trace 0 to 10%
Little 10 to 20%
Some 20 to 35%
And 35 to 50%

WATER CONTENT
D = Dry
M = Moist
W = Wet

* Measured at end of drilling. During drilling, W.T. measured at 8.4'

ANEPTEK CORPORATION

BORING LOG

Sheet 1 of 1

Boring No. SB-02

PROJECT North Smithfield ANGS
JOB NO. 94110.32
CONTRACTOR
DRILLER Seaboard
CONSULTANT Hager GeoScience, Inc.
LOGGED BY J. Hager

DATE 11/29/94
TIMES ~2:30 – 4:10 p.m.
DRILL RIG TYPE HSA (4.25") Mobil B-53
WEATHER/TEMP. clear, sunny, 50's
DEPTH TO WATER TABLE 9 FT. after 10 minutes.

LOCATION N. Smithfield Air National Guard, North Smithfield, RI
GROUND SURFACE ELEVATION
COMMENTS Samples – every 5' in AOC B W.L. at 2.1' after 16 hrs.

DEPTH BELOW GRADE (FT.)	SAMPLING (SPT) BLOWS PER 6"	PEN	REC	TYPE	SAMPLE DESCRIPTION	HNU
1	4 8	24"	6"	SPT	Top 2": Moist, loose brown fine to coarse sand with grass fragments, little to some silt, trace coarse to fine gravel. Lower 4": Moist, medium dense light brown fine sand, trace coarse to medium sand, little silt, trace coarse fine gravel.	HNU = 0ppm
2	10 12					
3						
4						
5						
6	22 31	24"	20"	SPT	Top 2": Moist, medium dense, light brown fine sand, trace coarse to medium sand, trace to little silt, trace coarse to fine gravel. *Lower 18": Wet, dense gray fine sand, trace silt, trace coarse medium sand, trace coarse to fine gravel.	HNU = 0ppm
7	33 35					
8						
9						
10					Augered to 10' – rare cobbles, very dense. No SPT sample taken at 10'. Cuttings are gray fine sand and silt, little clay, trace coarse to medium sand, trace coarse to fine gravel.	HNU = 0ppm
11						
12					End of boring at 10'. Grouted to surface.	
13						
14						
15						
16						
17						
18						
19						
20						

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT.	DENSITY	BLOWS/FT.	DENSITY
<4	V. LOOSE	<2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8 *	M. STIFF
30-50	DENSE	8-15	STIFF
>50	V. DENSE	15-30	V. STIFF
		>50	HARD

(SPT)
Standard Penetration Test= 140 lb. weight falling 30" onto a two foot long 2" O.D. split spoon sampler

PEN – Penetrated
REC – Recovered
HSA – Hollow-Stem Auger
SS – Split Spoon
PID – Photoionization Detector

PROPORTIONS
Trace 0 to 10%
Little 10 to 20%
Some 20 to 35%
And 35 to 50%

WATER CONTENT
D = Dry
M = Moist
W = Wet

* Color change (and change to medium dense to dense) estimated at 5.5'

ANEPTEK CORPORATION

BORING LOG

Sheet 1 of 1

Boring No. SB-03

PROJECT North Smithfield ANGS
JOB NO. 94110.32
CONTRACTOR
DRILLER Seaboard
CONSULTANT Hager GeoScience, Inc.
LOGGED BY J. Hager

DATE 11/30/94
TIMES 10:45 a.m. – 12:10 p.m
4.25" HSA
DRILL RIG TYPE Mobil B-53
WEATHER/TEMP. clear, sunny, 50's
DEPTH TO WATER TABLE >10 FT. at end of boring.

LOCATION N. Smithfield Air National Guard, North Smithfield, RI
GROUND SURFACE ELEVATION
COMMENTS Continuous sampling; MW-01 planned if water comes into hole.

DEPTH BELOW GRADE (FT.)	SAMPLING (SPT) BLOWS PER 6"	PEN	REC	TYPE	SAMPLE DESCRIPTION	HNU
1	* 4	24"	2"	SPT	Moist fill, loose brown coarse to fine sand, little silt, trace coarse to fine gravel.	HNU = 0ppm
2	5 3					
3	3 3	24"	5"	SPT		
4	3 10				Moist fill, medium brown coarse to fine sand, trace to little silt, trace coarse to fine gravel.	
5	12 11	24"	0"	SPT	No recovery – spoon hit obstruction at 6" – pushed obstruction out of the way, but collected no sample.	
6	9 4					
7	7 5	24"	10"	SPT	Top 4": As above (SPT SB-03 – 04.5) but wood fragments in spoon.	HNU = 0ppm
8	18 25				Bottom 6": In grass sleeve – change to natural fill material within sleeve: Moist dense to very dense fine gray sand, trace silt, trace coarse to medium sand, trace coarse to fine gravel.	
9	40 25	24"	18"	SPT		
10	40 47				Moist very dense fine gray sand, trace coarse to medium sand, trace silt, trace coarse to fine gravel.	
11	63 28	18.5"	18"	SPT	Moist, very dense, gray fine sand, little coarse to medium sand, trace silt, trace coarse to fine gravel.	HNU = 0ppm
12	63 87				Refusal with spoon at 12.5'.	HNU = 0ppm
13	100/05"				Augered to 12'. Boring was dry at completion. Left open overnight to determine if water will collect.	
14					End of boring at 12.5'.**	
15					Grouted to surface on 12/2/94.	
16						
17						
18						
19						
20						

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT.	DENSITY	BLOWS/FT.	DENSITY
<4	V. LOOSE	<2	V. SOFT
4–10	LOOSE	2–4	SOFT
10–30	M. DENSE	4–8	M. STIFF
30–50	DENSE	8–15	STIFF
>50	V. DENSE	15–30	V. STIFF
		>50	HARD

(SPT)
Standard Penetration Test= 140 lb. weight falling 30" onto a two foot long 2" O.D. split spoon sampler

PEN – Penetrated
REC – Recovered
HSA – Hollow-Stem Auger
SS – Split Spoon
PID – Photoionization Detector

PROPORTIONS
Trace 0 to 10%
Little 10 to 20%
Some 20 to 35%
And 35 to 50%

WATER CONTENT
D = Dry
M = Moist
W = Wet

* Gravel at surface down to 0.5'. Driller shoveled away gravel to reach sand at 0.5' and started sampling there.

** Boring still dry after 24 hours.

ANEPTEK CORPORATION

BORING LOG

Sheet 1 of 1

Boring No. SB-04

PROJECT North Smithfield ANGS
JOB NO. 94110.32
CONTRACTOR
DRILLER Seaboard
CONSULTANT Hager GeoScience, Inc.
LOGGED BY J. Hager

DATE 11/30/94
TIMES 2:05 pm - 2:55 pm
DRILL RIG TYPE 4.25" HSA Mobil B-53
WEATHER/TEMP. clear, sunny, 50's
DEPTH TO WATER TABLE ~10.5 FT. during drilling

LOCATION N. Smithfield Air National Guard, North Smithfield, RI
GROUND SURFACE ELEVATION
COMMENTS Sampling every 5' in AOC C

DEPTH BELOW GRADE (FT.)	SAMPLING (SPT) BLOWS PER 6"	PEN	REC	TYPE	SAMPLE DESCRIPTION	HNU
1	1 1	24"	12"	SPT	Moist fill, very loose, brown fine sand, trace coarse to medium sand, trace little silt.	
2	4 3					HNU = 0ppm
3					Augered through cobbles to 5'.	
4						
5						
6	1 2	24"	5"	SPT	Moist fill, medium dense, brown fine sand, trace coarse to medium sand, little silt, trace coarse to fine gravel, several fragments of coarse gravel broken by spoon. Stem root fragments.	
7	14 30					
8	4 12	24"	3"	SPT	Moist fill, medium dense, brown fine sand, trace coarse to medium sand, little silt, trace coarse to fine gravel. Stem root fragments.	
9	6 4					HNU = 0ppm
10					Augered through cobbles to 10'.	
11	9/5" 100/2"	5" 2"	0"	SPT	No recovery. Spoon refusal at 10' 5 1/2". Auger refusal at 10.5'.	
12					Cuttings wet.	
13					End of boring at 10.5'. Grouted to surface.	
14						
15						
16						
17						
18						
19						
20						

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT.	DENSITY	BLOWS/FT.	DENSITY
<4	V. LOOSE	<2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
>50	V. DENSE	15-30	V. STIFF
		>50	HARD

(SPT)
Standard Penetration Test= 140 lb. weight falling 30" onto a two foot long 2" O.D. split spoon sampler

PEN - Penetrated
REC - Recovered
HSA - Hollow-Stem Auger
SS - Split Spoon
PID - Photoionization Detector

PROPORTIONS
Trace 0 to 10%
Little 10 to 20%
Some 20 to 35%
And 35 to 50%

WATER CONTENT
D - Dry
M - Moist
W - Wet

ANEPTEK CORPORATION

BORING LOG

Sheet 1 of 1

Boring No. SB-05

PROJECT North Smithfield ANGS
JOB NO. 94110.32
CONTRACTOR
DRILLER Seaboard
CONSULTANT Hager GeoScience, Inc.
LOGGED BY J. Hager

DATE 11/30/94
TIMES 4:00 pm – 5:30 pm
DRILL RIG TYPE 4.25" HSA Mobil B-53
WEATHER/TEMP. clear, sunny 50's *
DEPTH TO WATER TABLE 14.5 FT. ** after completion of boring

LOCATION N. Smithfield Air National Guard, North Smithfield, RI
GROUND SURFACE ELEVATION
COMMENTS Sampling every 5'

DEPTH BELOW GRADE (FT.)	SAMPLING (SPT) BLOWS PER 6"	PEN	REC	TYPE	SAMPLE DESCRIPTION	HNU
1	17	24"	18"	SPT	0 – 0.5 – Pavement Moist fill, dense, dark brown fine to coarse sand, little silt, trace coarse to fine gravel. Tip of spoon contained reddish brown fine sand, trace coarse to medium sand, little silt.	HNU = 0ppm
2	24 21					
3	22				Augered through cobbles to 5' (out of fill by 5').	
4						
5						
6	27 66	17"	17"	SPT	Moist, very dense, light brown coarse to fine sand, little coarse to fine gravel, trace silt. Several cobbles broken by spoon.	HNU = 0ppm
7	150/5"					
8						
9					Augered through cobbles to 10'.	HNU = 0ppm
10						
11	11 12	24"	14"	SPT	Wet, dense, light brown fine sand trace silt, trace to medium sand, trace coarse to fine gravel.	
12	22 28					
13						
14					Augered through cobbles to 15'	
15						
16	22 45	20.5"	14"	SPT	Wet, very dense, light brown fine sand, trace coarse to medium sand, trace silt, trace coarse to fine gravel. Tip of spoon possible sampled bedrock, fragments of mica schist (musconite) and fine gray sand with musconite.	HNU = 0ppm
17	70 100/25"					
18					Refusal of spoon at 16' 8.5".	
19					End of boring at 16.7'.	
20					Grouted to surface 12/1/94.	

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT.	DENSITY	BLOWS/FT.	DENSITY
<4	V. LOOSE	<2	V. SOFT
4–10	LOOSE	2–4	SOFT
10–30	M. DENSE	4–8	M. STIFF
30–50	DENSE	8–15	STIFF
>50	V. DENSE	15–30	V. STIFF
		>50	HARD

(SPT)
Standard Penetration Test= 140 lb. weight falling 30" onto a two-foot long 2" O.D. split spoon sampler

PEN – Penetrated
REC – Recovered
HSA – Hollow-Stem Auger
SS – Split Spoon
PID – Photoionization Detector

PROPORTIONS
Trace 0 to 10%
Little 10 to 20%
Some 20 to 35%
And 35 to 50%

WATER CONTENT
D = Dry
M = Moist
W = Wet

* Dark before boring completed. ** W.L. 11.0' after 14.5 hours. (Boring left open overnight and grouted on 12/1/94)

ANEPTEK CORPORATION

BORING LOG

Sheet 1 of 1

Boring No. SB-06

PROJECT North Smithfield ANGS
JOB NO. 94110.32
CONTRACTOR
DRILLER Seaboard
CONSULTANT Hager GeoScience, Inc.
LOGGED BY J. Hager

DATE 12/1/94
TIMES 10:00 am – 10:50 am
DRILL RIG TYPE 4.25" HSA Mobil B-53
WEATHER/TEMP. clear, cold, 30's
DEPTH TO WATER TABLE 7.8 FT. after completion of boring

LOCATION N. Smithfield Air National Guard, North Smithfield, RI
GROUND SURFACE ELEVATION
COMMENTS Sampling every 5' on lawn in front of building

DEPTH BELOW GRADE (FT.)	SAMPLING (SPT) BLOWS PER 6"	PEN	REC	TYPE	SAMPLE DESCRIPTION	HNU
1	3 20	24"	13"	SPT	Moist fill, grass at surface with roots to 2". Then dense, dark brown to brown fine to coarse sand, little silt, trace coarse to fine gravel. Broken cobble in spoon tip.	HNU = 0ppm
2	15 10					
3						
4					Augered through cobbles to 5'.	
5						
6	39 55	24"	12"	SPT	Upper ~4": As above.	HNU = 0ppm
7	47 42				Lower 8": Moist fill, very dense, fine gray-brown sand, trace coarse to medium sand, trace silt, trace coarse to fine gravel. Broken cobble lodged in spoon tip.	
8						
9						
10						
11	11 19	24"	18"	SPT	Wet, dense, brown fine sand, trace coarse to medium sand, little silt, trace coarse to fine gravel, 2" x 1" piece of gravel in spoon (granite).	
12	34 47					
13					End of boring at 12'.	
14					Grouted to surface 12/2/94.	
15						
16						
17						
18						
19						
20						

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT.	DENSITY	BLOWS/FT.	DENSITY
<4	V. LOOSE	<2	V. SOFT
4–10	LOOSE	2–4	SOFT
10–30	M. DENSE	4–8	M. STIFF
30–50	DENSE	8–15	STIFF
>50	V. DENSE	15–30	V. STIFF
		>50	HARD

(SPT)
Standard Penetration Test= 140 lb. weight falling 30" onto a two foot long 2" O.D. split spoon sampler

PEN – Penetrated
REC – Recovered
HSA – Hollow-Stem Auger
SS – Split Spoon
PID – Photoionization Detector

PROPORTIONS
Trace 0 to 10%
Little 10 to 20%
Some 20 to 35%
And 35 to 50%

WATER CONTENT
D = Dry
M = Moist
W = Wet

* Water encountered at 8' during drilling. Rose to 7.8' at end of drilling and continued to rise thereafter.

** Estimate change to natural material at ~5 1/2'

ANEPTEK CORPORATION

BORING LOG

Sheet 1 of 1

Boring No. SB-07

PROJECT North Smithfield ANGS
JOB NO. 94110.32
CONTRACTOR
DRILLER Seaboard
CONSULTANT Hager GeoScience, Inc.
LOGGED BY J. Hager

DATE 12/1/94
TIMES 12:10 pm – 12:30 pm
DRILL RIG TYPE 4.25" HSA Mobil B-53
WEATHER/TEMP. clear, cold, 30's
DEPTH TO WATER TABLE 7.5 FT. at end of boring

LOCATION N. Smithfield Air National Guard, North Smithfield, RI
GROUND SURFACE ELEVATION
COMMENTS Sampling every 5'

DEPTH BELOW GRADE (FT.)	SAMPLING (SPT) BLOWS PER 6"	PEN	REC	TYPE	SAMPLE DESCRIPTION	HNU
1	8	24"	12"	SPT	0 – 0.5' Pavement Moist fill, medium dense, dark brown to brown coarse to fine sand, trace silt, moist little coarse to fine gravel.	HNU=0.2ppm*
2	8 8					
3	9				Augered through cobbles to 5'.	
4					Auger refusal at 5' bedrock. No probable water detected.	
5					End of boring at 5'.	
6					Boring grouted to surface.	
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT.	DENSITY	BLOWS/FT.	DENSITY
<4	V. LOOSE	<2	V. SOFT
4–10	LOOSE	2–4	SOFT
10–30	M. DENSE	4–8	M. STIFF
30–50	DENSE	8–15	STIFF
>50	V. DENSE	15–30	V. STIFF
		>50	HARD

(SPT)
Standard Penetration Test– 140 lb. weight falling 30" onto a two foot long 2" O.D. split spoon sampler

PEN – Penetrated
REC – Recovered
HSA – Hollow-Stem Auger
SS – Split Spoon
PID – Photoionization Detector

PROPORTIONS
Trace 0 to 10%
Little 10 to 20%
Some 20 to 35%
And 35 to 50%

WATER CONTENT
D = Dry
M = Moist
W = Wet

* HNU reading slightly above 0 appears to be background in this area affected by exhaust fumes from the rig.

ANEPTEK CORPORATION

BORING LOG

Sheet 1 of 1

Boring No. SB-08

PROJECT North Smithfield ANGS
JOB NO. 94110.32
CONTRACTOR
DRILLER Seaboard
CONSULTANT Hager GeoScience, Inc.
LOGGED BY J. Hager

DATE 12/1/94
TIMES 1:50 pm – 2:20 pm

DRILL RIG TYPE 4.25" HSA, Mobil B-53
WEATHER/TEMP. clear, cold, 30's
DEPTH TO WATER TABLE 6.5 FT. at end of drilling

LOCATION N. Smithfield Air National Guard, North Smithfield, RI between building 102 and 104
GROUND SURFACE ELEVATION
COMMENTS Sampling every 5'

DEPTH BELOW GRADE (FT.)	SAMPLING (SPT) BLOWS PER 6"	PEN	REC	TYPE	SAMPLE DESCRIPTION	HNU
1	30	24"	9"	SPT	0 – 0.5' Pavement Moist fill, medium dense, brown fine sand, trace coarse to medium sand, trace silt, trace coarse to fine gravel.	HNU=0ppm
2	11 9					
3	12				Augered through cobbles to 5'.	
4						
5						
6	20 20	24"	14"	SPT	Top 2": As above. *Lower 12": Wet fill, dense, light brown fine sand, trace coarse medium sand, little silt, trace coarse to fine gravel	HNU=0ppm
7	15 11					
8					End of boring at 7'. Grouted to surface.	
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT.	DENSITY	BLOWS/FT.	DENSITY
<4	V. LOOSE	<2	V. SOFT
4–10	LOOSE	2–4	SOFT
10–30	M. DENSE	4–8	M. STIFF
30–50	DENSE	8–15	STIFF
>50	V. DENSE	15–30	V. STIFF
		>50	HARD

(SPT)
Standard Penetration Test= 140 lb. weight falling 30" onto a two foot long 2" O.D. split spoon sampler

PEN – Penetrated
REC – Recovered
HSA – Hollow-Stem Auger
SS – Split Spoon
PID – Photoionization Detector

PROPORTIONS
Trace 0 to 10%
Little 10 to 20%
Some 20 to 35%
And 35 to 50%

WATER CONTENT
D = Dry
M = Moist
W = Wet

* Estimate change to natural material at ~5'.

ANEPTEK CORPORATION

BORING LOG

Sheet 1 of 1

Boring No. SB-09

PROJECT North Smithfield ANGS
JOB NO. 94110.32
CONTRACTOR
DRILLER Seaboard
CONSULTANT Hager GeoScience, Inc.
LOGGED BY J. Hager

DATE 12/2/94
TIMES 11:25 am – 12:20 pm
DRILL RIG TYPE HSA 4.25", Mobil B-53
WEATHER/TEMP. partly cloudy, ~30°F
DEPTH TO WATER TABLE 8.3 FT. after ~ 1 hour

LOCATION N. Smithfield Air National Guard, North Smithfield, RI
NE of bldg 110
GROUND SURFACE ELEVATION AOC A
COMMENTS

DEPTH BELOW GRADE (FT.)	SAMPLING (SPT) BLOWS PER 6"	PEN	REC	TYPE	SAMPLE DESCRIPTION	HNU
1	12	24"	19"	SPT	0 – 0.5' Pavement Top 13": Moist fill, red-brown fine sand, trace medium to coarse sand, trace silt, little coarse to fine gravel *Lower ~6": (change in brass sleeve) Moist, dense, light brown fine sand, trace coarse medium sand, trace silt, trace coarse to fine gravel.	HNU = 0ppm
2	14 16					
3	25					
4					Augered through cobbles to 5'.	
5						
6	25 19	24"	15"	SPT	Moist, tip of spoon wet, dense, gray-brown fine sand, trace coarse to medium sand, trace silt, trace fine gravel.	HNU = 0ppm
7	15 18					
8					Augered to 10' through occasional cobbles.	
9						
10						
11	26 46	24"	20"	SPT	Wet, very dense, gray-brown fine sand, trace coarse to medium sand, trace fine to coarse gravel, little silt.	HNU = 0ppm
12	54 51				End of boring at 12'. Grouted to surface.	
13						
14						
15						
16						
17						
18						
19						
20						

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT.	DENSITY	BLOWS/FT.	DENSITY
<4	V. LOOSE	<2	V. SOFT
4–10	LOOSE	2–4	SOFT
10–30	M. DENSE	4–8*	M. STIFF
30–50	DENSE	8–15	STIFF*
>50	V. DENSE	15–30	V. STIFF
		>50	HARD

(SPT)
Standard Penetration Test– 140 lb. weight falling 30" onto a two foot long 2" O.D. split spoon sampler

PEN – Penetrated
REC – Recovered
HSA – Hollow-Stem Auger
SS – Split Spoon
PID – Photoionization Detector

PROPORTIONS	
Trace	0 to 10%
Little	10 to 20%
Some	20 to 35%
And	35 to 50%

WATER CONTENT	
D	= Dry
M	= Moist
W	= Wet

* Out of fill at ~ 1 1/2' – 2' below ground surface.

ANEPTEK CORPORATION

BORING LOG

Sheet 1 of 1

Boring No. SB-10

PROJECT North Smithfield ANGS
JOB NO. 94110.32
CONTRACTOR
DRILLER Seaboard
CONSULTANT Hager GeoScience, Inc.
LOGGED BY J. Hager

DATE 12/2/94
TIMES 1:30 pm – 2:30 pm

DRILL RIG TYPE 4.25" HSA, Mobil B-53
WEATHER/TEMP. partly cloudy, ~30° F
DEPTH TO WATER TABLE ~7 FT.
during drillings after 72 hours

LOCATION N. Smithfield Air National Guard, North Smithfield, RI corner of building 110
GROUND SURFACE ELEVATION AOC A
COMMENTS Continuous sampling

DEPTH BELOW GRADE (FT.)	SAMPLING (SPT) BLOWS PER 6"	PEN	REC	TYPE	SAMPLE DESCRIPTION	HNU
1	19 14	24"	13"	SPT	Moist fill, coarse gravel and asphalt at surface, medium dense, dark brown to brown coarse to fine sand, little silte, trace coarse to fine gravel.	HNU=0 ppm
2	9 7					HNU=0 ppm
3	3 18	24"	19"	SPT	Top 3": As above. + Bottom 16": Moist, dense, light brown to gray–brown fine sand, trace coarse to medium sand, trace silt, trace fine gravel.	HNU=0.5ppm*
4	25 30					HNU=8ppm **
5	18 18	24"	18"	SPT	Moist, dense, light brown to gray–brown silty fine sand, trace coarse to medium sand, trace coarse to fine gravel, trace clay, broken cobble in spoon.	HNU=3.5 – 5 ppm (sample in spoon)
6	17 20					
7	9 17	24"	12"	SPT	Spoon tip wet, dense, gray–brown silty fine sand, trace coarse to medium sand, trace coarse to fine gravel, trace clay.	
8	30 22				Augered to 7'. Cuttings wet. HNU at drill bit =10 ppm HNU in breathing zone = 0.4 ppm.	HNU=0ppm
9					End of boring at 8'. Grouted to surface.	
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT.	DENSITY	BLOWS/FT.	DENSITY
<4	V. LOOSE	<2	V. SOFT
4–10	LOOSE	2–4	SOFT
10–30	M. DENSE	4–8	M. STIFF
30–50	DENSE	8–15	STIFF
>50	V. DENSE	15–30	V. STIFF
		>50	HARD

(SPT)
Standard Penetration Test= 140 lb. weight falling 30" onto a two foot long 2" O.D. split spoon sampler

PEN – Penetrated
REC – Recovered
HSA – Hollow-Stem Auger
SS – Split Spoon
PID – Photoionization Detector

PROPORTIONS
Trace 0 to 10%
Little 10 to 20%
Some 20 to 35%
And 35 to 50%

WATER CONTENT
D = Dry
M = Moist
W = Wet

* Breathing zone. ** At ground level. Up to 17 ppm when wind died down. + Out of fill at ~ 2 1/2' – 3'.

ANEPTEK CORPORATION

BORING LOG

Sheet 1 of 1

Boring No. SB-11

PROJECT North Smithfield ANGS
JOB NO. 94110.32
CONTRACTOR
DRILLER Seaboard
CONSULTANT Hager GeoScience, Inc.
LOGGED BY J. Hager

DATE 12/5/94
TIMES 11:25 am - 12:15 pm

DRILL RIG TYPE 4.25" HSA, Mobil B-53
WEATHER/TEMP. rain, 40's
DEPTH TO WATER TABLE 7.5 FT. after drilling

LOCATION N. Smithfield Air National Guard, North Smithfield, RI of building 109 AOC A
GROUND SURFACE ELEVATION

COMMENTS

DEPTH BELOW GRADE (FT.)	SAMPLING (SPT) BLOWS PER 6"	PEN	REC	TYPE	SAMPLE DESCRIPTION	HNU
1	10 15	24"	12"	SPT	Moist fill, medium to dense coarse gravel, little medium to fine gravel, little coarse to fine brown sand, trace silt.	HNU=0ppm*
2	10 14				+Tip of spoon contained fine brown sand, trace coarse to medium sand, little silt, trace fine gravel.	
3						
4					Augered through cobbles to 5'. Strong odor in soil at 5'.	
5						HNU=20ppm @ borehole
6	21 21	24"	12"	SPT	Wet, dense, gray fine sandy silt, trace coarse to medium sand, trace coarse to fine gravel, trace little clay. Sheen on water in spoon.	HNU=0.4ppm in breathing zone
7	16 16					
8						HNU=0ppm during augering
9					Augered through cobbles to 10'.	HNU=7ppm in augers
10						HNU=0ppm breathing zone
11	22 31	24"	18"	SPT	Wet, very dense, gray fine sandy silt, trace coarse to medium sand, trace fine gravel, trace clay.	
12	54 56				End of boring at 12'.	
13					Sheen on water in boring at completion of drilling.	
14					Grouted to surface.	
15						
16						
17						
18						
19						
20						

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT.	DENSITY	BLOWS/FT.	DENSITY
<4	V. LOOSE	<2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
>50	V. DENSE	15-30	V. STIFF
		>50	HARD

(SPT)
Standard Penetration Test= 140 lb. weight falling 30" onto a two foot long 2" O.D. split spoon sampler

PEN - Penetrated
REC - Recovered
HSA - Hollow-Stem Auger
SS - Split Spoon
PID - Photoionization Detector

PROPORTIONS
Trace 0 to 10%
Little 10 to 20%
Some 20 to 35%
And 35 to 50%

WATER CONTENT
D = Dry
M = Moist
W = Wet

+ Estimate change to natural material at ~2'. * Odor evident at ~ 1.5'.

ANEPTEK CORPORATION

BORING LOG

Sheet 1 of 1

Boring No. SB-12

PROJECT North Smithfield ANGS
JOB NO. 94110.32
CONTRACTOR
DRILLER Seaboard
CONSULTANT Hager GeoScience, Inc.
LOGGED BY J. Hager

DATE 12/5/94
TIMES 1:55 pm – 2:45 pm

DRILL RIG TYPE 4.25" HSA, Mobil B-53
WEATHER/TEMP. rain, 40's
DEPTH TO WATER TABLE ~9 FT. after drilling

LOCATION N. Smithfield Air National Guard, North Smithfield, RI south of builging 107
GROUND SURFACE ELEVATION

COMMENTS HNU readings because erratic because of the rain

DEPTH BELOW GRADE (FT.)	SAMPLING (SPT) BLOWS PER 6"	PEN	REC	TYPE	SAMPLE DESCRIPTION	HNU
1	23	24"	6"	SPT	0 – 0.5' Pavement *Moist fill, medium dense, brown fine sandy silt, trace coarse to medium sand, trace coarse fine gravel.	
2	12 12					
3	12				Augered through cobbles to 5'.	
4						HNU=0ppm
5						
6	17 24	24"	14"	SPT	Moist very dense, gray-brown coarse to fine sand, little silt, trace coarse to fine gravel. (cuttings wet at 7.5')	
7	28 33					
8					Augered through cobbles to 10'.	
9						
10						
11	33 55	24"	15"	SPT	Wet, very dense, gray-brown fine sandy silt, trace coarse to medium sand, trace coarse to fine gravel, trace clay. Broken cobble in spoon.	N.D.
12	40 76					
13						
14					End of boring at 12'. Grouted to surface.	
15						
16						
17						
18						
19						
20						

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT.	DENSITY	BLOWS/FT.	DENSITY
<4	V. LOOSE	<2	V. SOFT
4–10	LOOSE	2–4	SOFT
10–30	M. DENSE	4–8	M. STIFF
30–50	DENSE	8–15	STIFF
>50	V. DENSE	15–30	V. STIFF
		>50	HARD

(SPT)
Standard Penetration Test= 140 lb. weight falling 30" onto a two foot long 2" O.D. split spoon sampler

PEN – Penetrated
REC – Recovered
HSA – Hollow-Stem Auger
SS – Split Spoon
PID – Photoionization Detector

PROPORTIONS
Trace 0 to 10%
Little 10 to 20%
Some 20 to 35%
And 35 to 50%

WATER CONTENT
D = Dry
M = Moist
W = Wet

* Estimate change to natural material at ~ 2' – 2 1/2'.

ANEPTEK CORPORATION

BORING LOG

Sheet 1 of 1

Boring No. SB-13

PROJECT North Smithfield ANGS
JOB NO. 94110.32
CONTRACTOR
DRILLER Seaboard
CONSULTANT Hager GeoScience, Inc.
LOGGED BY J. Hager

DATE 12/6/94
TIMES 10:10 am – 11:00 am

DRILL RIG TYPE 4.25" HSA, Mobil B-53
WEATHER/TEMP. partly cloudy, 50's
DEPTH TO WATER TABLE 5.7 FT. after 3 hours.

LOCATION N. Smithfield Air National Guard, North Smithfield, RI
SG-64
GROUND SURFACE ELEVATION

COMMENTS Boring was planned for outside the fence, but ground was too soft for rig access.

DEPTH BELOW GRADE (FT.)	SAMPLING (SPT) BLOWS PER 6"	PEN	REC	TYPE	SAMPLE DESCRIPTION	HNU
1	44	24"	15"	SPT	0 – 0.5' Pavement *Moist fill, very dense, brown fine sand, trace coarse to medium sand, trace littlw silt, little coarse to fine gravel. Broken cobbles in spoon. Tip of spoon contained lighter brown fine sand.	HNU=0ppm **
2	65 29					
3	23					
4					Augered through cobbles to 5'.	
5						
6	18 33	24"	12"	SPT	Moist, very dense, gray–brown fine sand, trace coarse to medium sand, trace silt trace coarse to fine gravel.	N.D.
7	44 71					
8					Augered through cobbles to 10'.	
9						
10						
11	30 100/4"	10"	6"	SPT	Wet, very dense, gray–brown fine sand, trace coarse to medium sand, trace little silt, trace coarse to fine gravel. Spoon refusal in a cobble.	N.D.
12					End of boring at 10.8'. Grouted to surface.	
13						
14						
15						
16						
17						
18						
19						
20						

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT.	DENSITY	BLOWS/FT.	DENSITY
<4	V. LOOSE	<2	V. SOFT
4–10	LOOSE	2–4	SOFT
10–30	M. DENSE	4–8	M. STIFF
30–50	DENSE	8–15	STIFF
>50	V. DENSE	15–30	V. STIFF
		>50	HARD

(SPT)
Standard Penetration Test= 140 lb. weight falling 30" onto a two foot long 2" O.D. split spoon sampler

PEN – Penetrated
REC – Recovered
HSA – Hollow-Stem Auger
SS – Split Spoon
PID – Photoionization Detector

PROPORTIONS
Trace 0 to 10%
Little 10 to 20%
Some 20 to 35%
And 35 to 50%

WATER CONTENT
D – Dry
M – Moist
W – Wet

* Estimate change to natural material at ~ 2.5'. ** HNU behaving very eratically – could not get repeatable readings.

ANEPTEK CORPORATION

BORING LOG

Sheet 1 of 1

Boring No. SB-14/MW-02

PROJECT North Smithfield ANGS
JOB NO. 94110.32
CONTRACTOR
DRILLER Seaboard
CONSULTANT Hager GeoScience, Inc.
LOGGED BY J. Hager

DATE 12/6/94
TIMES 11:25 am – 11:50 am
DRILL RIG TYPE 4.25" HSA, Mobil B-53
WEATHER/TEMP. partly cloudy, 50's
DEPTH TO WATER TABLE 4 FT.
after drilling 3' after 1 hour.

LOCATION N. Smithfield Air National Guard, North Smithfield, RI
NW corner of site
GROUND SURFACE ELEVATION
COMMENTS Boring was planned for outside the fence but ground was too soft for rig access – MW-02 installed

DEPTH BELOW GRADE (FT.)	SAMPLING (SPT) BLOWS PER 6"	PEN	REC	TYPE	SAMPLE DESCRIPTION	HNU
1	15	24"	8"	SPT	0 –0.5' Pavement. Moist fill, medium dense, dark brown to brown coarse to fine sand, little coarse to fine gravel, trace silt.	N.D.*
2	10 10				**Tip of spoon contained brown fine sand, trace coarse to medium sand, trace to little silt, trace coarse to fine gravel.	
3	4					
4					Augered through cobbles to 5'.	
5						
6	40 56	24"	21"	SPT	Wet, very dense, gray-brown fine sand, trace coarse to medium sand, trace coarse to fine gravel, trace to little silt.	N.D.*
7	60 65					
8					Augered to 8.5' to install well. (see diagram for MW-02)	
9					End of boring at 8.5'.	
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT.	DENSITY	BLOWS/FT.	DENSITY
<4	V. LOOSE	<2	V. SOFT
4–10	LOOSE	2–4	SOFT
10–30	M. DENSE	4–8	M. STIFF
30–50	DENSE	8–15	STIFF
>50	V. DENSE	15–30	V. STIFF
		>50	HARD

(SPT)
Standard Penetration Test= 140 lb. weight falling 30" onto a two foot long 2" O.D. split spoon sampler

PEN – Penetrated
REC – Recovered
HSA – Hollow-Stem Auger
SS – Split Spoon
PID – Photoionization Detector

PROPORTIONS	WATER CONTENT
Trace 0 to 10%	D = Dry
Little 10 to 20%	M = Moist
Some 20 to 35%	W = Wet
And 35 to 50%	

* HNU behaving very erratically – could not get repeatable readings, so values are not noted.
** Estimate change to natural material at ~ 2' – 2 1/2'.

ANEPTEK CORPORATION

BORING LOG

Sheet 1 of 1

Boring No. MW-01

PROJECT North Smithfield ANGS
JOB NO. 94110.32
CONTRACTOR
DRILLER Seaboard
CONSULTANT Hager GeoScience, Inc.
LOGGED BY J. Hager

DATE 12/5/94
TIMES 8:05 am – 10:00 am

DRILL RIG TYPE 4.25" HSA, Mobil B-53
WEATHER/TEMP. rain, 50's
DEPTH TO WATER TABLE ~9 FT. during drilling

LOCATION N. Smithfield Air National Guard, North Smithfield, RI SG-54
GROUND SURFACE ELEVATION

COMMENTS Well installed – soil samples discarded after logging – see diagram for MW-01

DEPTH BELOW GRADE (FT.)	SAMPLING (SPT) BLOWS PER 6"	PEN	REC	TYPE	SAMPLE DESCRIPTION	HNU
1	16	24"	20"	SPT	0 – 0.5' Pavement Upper 12": Moist fill, dense, dark to light brown fine sand, trace medium coarse sand, trace to little silt, trace fine to coarse gravel. * Lower 8": Moist, dense, red-brown fine sand, trace coarse to medium sand, trace silt.	HNU=0ppm
2	19 11					
3	35					
4					Augered through cobbles to 5'.	
5						
6	19 23	24"	17"	SPT	Moist, dense to very dense, light gray-brown fine sand, trace coarse to medium sand, little silt, trace coarse to fine gravel, trace little clay.	HNU=0ppm
7	23 15/4"					
8	100/2"				Augered through cobbles to 10'.	
9						
10						
11	16 36	24"	17"	SPT	Wet, very dense, gray-brown fine sand silt, trace medium coarse sand, trace coarse to fine gravel, trace clay.	HNU=0ppm
12	43 74					
13					Augered to 13' and installed well (see diagram for MW-01)	
14					End of boring at 13'.	
15						
16						
17						
18						
19						
20						

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT.	DENSITY	BLOWS/FT.	DENSITY
<4	V. LOOSE	<2	V. SOFT
4–10	LOOSE	2–4	SOFT
10–30	M. DENSE	4–8	M. STIFF
30–50	DENSE	8–15	STIFF
>50	V. DENSE	15–30	V. STIFF
		>50	HARD

(SPT)
Standard Penetration Test=
140 lb. weight falling 30" onto a two foot long 2" O.D. split spoon sampler

PEN – Penetrated
REC – Recovered
HSA – Hollow-Stem Auger
SS – Split Spoon
PID – Photoionization Detector

PROPORTIONS
Trace 0 to 10%
Little 10 to 20%
Some 20 to 35%
And 35 to 50%

WATER CONTENT
D = Dry
M = Moist
W = Wet

• Estimate change to natural material at 1 1/2' – 2'.

ANEPTEK CORPORATION

BORING LOG

Sheet 1 of 1

Boring No. MW-03

PROJECT North Smithfield ANGS
JOB NO. 94110.32
CONTRACTOR
DRILLER Seaboard
CONSULTANT Hager GeoScience, Inc.
LOGGED BY J. Hager

DATE 12/6/94
TIMES 3:30 pm – 4:05 pm

DRILL RIG TYPE 4.25" HSA Mobil B-53
WEATHER/TEMP. partly cloudy 50's
DEPTH TO WATER TABLE 3.5 FT.
during drilling 3.0' after 16 hours.

LOCATION N. Smithfield Air National Guard, North Smithfield, RI at SG-32 west of existing well.
GROUND SURFACE ELEVATION

COMMENTS At edge of woods south of base, west of access road.

DEPTH BELOW GRADE (FT.)	SAMPLING (SPT) BLOWS PER 6"	PEN	REC	TYPE	SAMPLE DESCRIPTION	HNU
1	1 1	24"	13"	SPT	Moist, very loose, brown fine sandy silt, trace coarse to medium sand, trace coarse to fine gravel, roots.	N.D.*
2	2 1				Dark brown organic silt in tip of spoon.	
3					Auger hit a boulder at 3'. Boring had to be moved 2' south and restarted. Color change at ~4' to gray-brown.	
4						
5						
6	2 10	24"	17"	SPT	Wet, dense gray-brown fine sand trace coarse to medium sand, trace coarse to fine gravel, trace silt.	
7	32 32					N.D.*
8					Ended at 7' and left overnight augered to 8.5' on 12/7/94 and installed well. (see diagram for MW-03)	
9					End of boring at 8.5'.	
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT.	DENSITY	BLOWS/FT.	DENSITY
<4	V. LOOSE	<2	V. SOFT
4-10	LOOSE	2-4	SOFT
10-30	M. DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
>50	V. DENSE	15-30	V. STIFF
		>50	HARD

(SPT)
Standard Penetration Test= 140 lb. weight falling 30" onto a two foot long 2" O.D. split spoon sampler

PEN – Penetrated
REC – Recovered
HSA – Hollow-Stem Auger
SS – Split Spoon
PID – Photoionization Detector

PROPORTIONS	
Trace	0 to 10%
Little	10 to 20%
Some	20 to 35%
And	35 to 50%

WATER CONTENT	
D	= Dry
M	= Moist
W	= Wet

* HNU behaving very erratically – could not get repeatable readings, so values are not noted.

ANEPTEK CORPORATION

BORING LOG

Sheet 1 of 1

Boring No. MW-04

PROJECT North Smithfield ANGS
JOB NO. 94110.32
CONTRACTOR
DRILLER Seaboard
CONSULTANT Hager GeoScience, Inc.
LOGGED BY J. Hager

DATE 12/7/94
TIMES 10:25 am – 1:00 pm

DRILL RIG TYPE 4.25" HSA, Mobil B-53
WEATHER/TEMP. cloudy, then rain, 40's
DEPTH TO WATER TABLE 3.5 FT. after drilling.

LOCATION N. Smithfield Air National Guard, North Smithfield, RI
GROUND SURFACE ELEVATION
COMMENTS Outside fence north of building 106 (motor pool)

DEPTH BELOW GRADE (FT.)	SAMPLING (SPT) BLOWS PER 6"	PEN	REC	TYPE	SAMPLE DESCRIPTION	HNU
1	1 3	24"	16"	SPT	Top 2": Moist very loose, dark brown organic silt w/ leaf litter, trace coarse to fine sand, trace coarse to fine gravel.	N.D. *
2	2 5				Bottom 14": Loose, red-brown silt, trace coarse to fine sand, trace coarse to fine gravel.	
3					Augered through cobbles to 45'. Auger refusal at 4.5'. Boring dry. Moved to new location betewwn SG-57 and SG-76. Materail resampled at 0-2'. Blows = 1-1-3-11	
4						
5						
6	88 62	24"	17"	SPT	Wet, very dense, gray brown fine sandy silt, trace coarse to medium sand, trace coarse to fine gravel. Broken cobble in spoon.	
7	60 59					
8					Augered to 8.5' through cobbles and installed well (see diagram for MW-04)	
9						
10						N.D. *
11						
12					End of boring at 8.5'	
13						
14						
15						
16						
17						
18						
19						
20						

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT.	DENSITY	BLOWS/FT.	DENSITY
<4	V. LOOSE	<2	V. SOFT
4–10	LOOSE	2–4	SOFT
10–30	M. DENSE	4–8	M. STIFF
30–50	DENSE	8–15	STIFF
>50	V. DENSE	15–30	V. STIFF
		>50	HARD

(SPT)
Standard Penetration Test- 140 lb. weight falling 30" onto a two foot long 2" O.D. split spoon sampler

PEN – Penetrated
REC – Recovered
HSA – Hollow-Stem Auger
SS – Split Spoon
PID – Photoionization Detector

PROPORTIONS
Trace 0 to 10%
Little 10 to 20%
Some 20 to 35%
And 35 to 50%

WATER CONTENT
D = Dry
M = Moist
W = Wet

* HNU could not be zeroed; negative readings only, so values were not recorded. Driller and inspector evaluated nature of material.

APPENDIX D

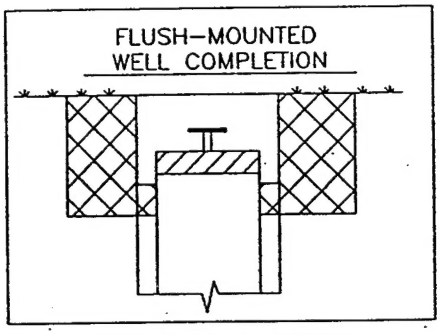
MONITORING WELL CONSTRUCTION LOGS

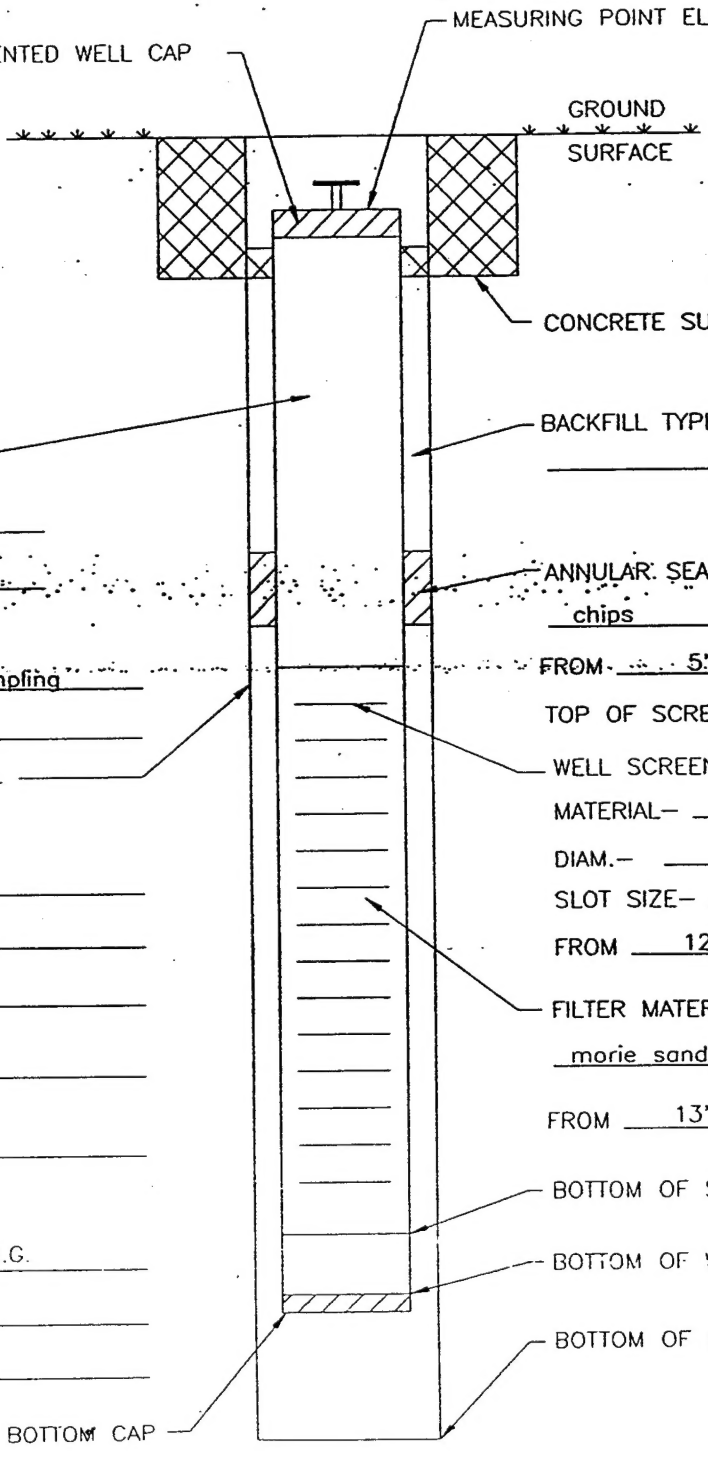
MONITORING WELL DIAGRAM – FLUSH MOUNT

JOB NO. 94110.32 WELL NO. MW-01 DATE/TIME 12/5/94 8:05am-10:00am

PROJECT N. Smithfield ANGS CONTRACTOR Aneptek Corporation LOCATION N. Smithfield ANGS, @SG-54, S of bldg. 105

DRILLER Seaboard CONSULTANT Hager GeoScience, Inc. LOGGED BY J. Hager



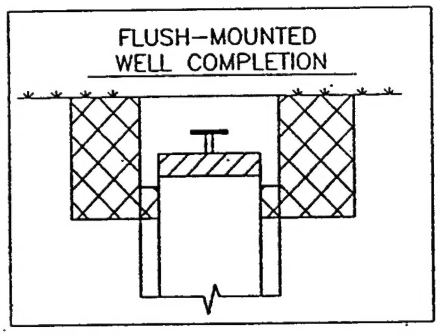


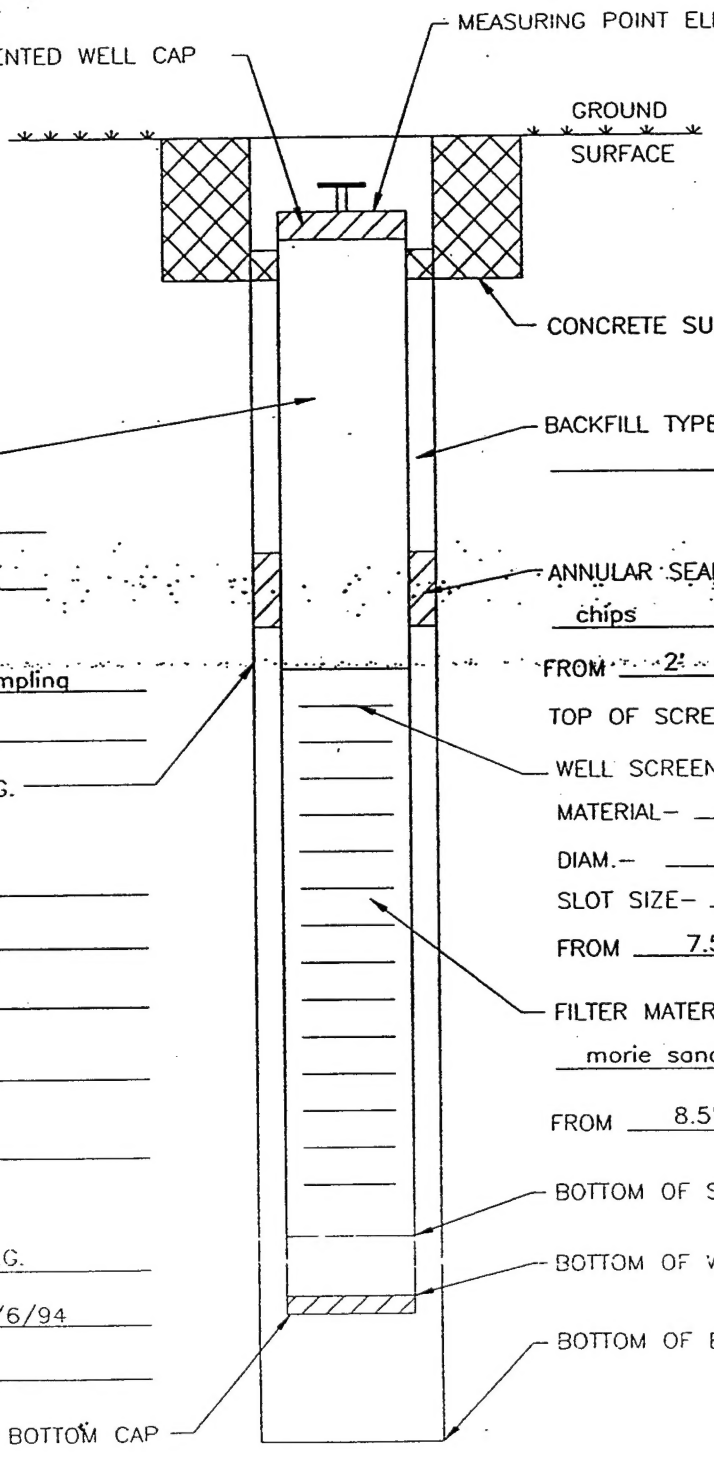
MONITORING WELL DIAGRAM – FLUSH MOUNT

JOB NO. 94110.32 WELL NO. MW-02 (SB-14) DATE/TIME 12/6/94 11:25am-1:50 pm

PROJECT N. Smithfield ANGS CONTRACTOR Aneptek Corporation LOCATION N. Smithfield, ANGS NW corner of site

DRILLER Seaboard CONSULTANT Hager GeoScience, Inc. LOGGED BY J. Hager



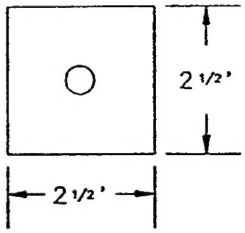


MONITORING WELL DIAGRAM

JOB NO. 94110.32 WELL NO. MW-03 DATE/TIME 12/6/94 3:30pm – 4:05pm (completed 12/7/94 9:30 am)

PROJECT N. Smithfield ANGS CONTRACTOR Aneptek Corporation LOCATION N. Smithfield ANGS @ SG-32, west of existing well.

DRILLER Seaboard CONSULTANT Hager GeoScience, Inc. LOGGED BY J. Hager



TOP OF CONCRETE PAD

VENTED WELL CAP

MEASURING POINT ELEV.

PROTECTIVE CASING

DIAM.– 4.5'

LENGTH– 4.5' (3.3' stick up)

CONCRETE SURFACE SEAL

2 1/2' x 2 1/2", ~9" thick at edges + 1.5' thick in center.

GROUND SURFACE

WELL RISER PIPE

MATERIAL PVC

DIAM. 2"

METHOD DRILLED

4.25" HSA Split Spoon Sampling every 5' to 7' B.G.

#1 sand from 2.5' to 2' B.G.

METHOD DEVELOPED

DATE _____ TIME _____

WATERTABLE DEPTH BG _____

DATE _____ TIME _____

COMMENTS W.L. at 3.0' B.G. at 8:30 am on 12/7/94

BG – BELOW GRADE

BOTTOM CAP

BACKFILL TYPE– grout

ANNULAR SEAL TYPE– bentonite chips

FROM 2' TO 1' BG

TOP OF SCREEN 2.5'

WELL SCREEN

MATERIAL– PVC

DIAM.– 2"

SLOT SIZE– 10

FROM 7.5' TO 2.5' BG

FILTER MATERIAL TYPE #2 morie sand

FROM 8.5' TO 2.5' BG

BOTTOM OF SCREEN 7.5'

BOTTOM OF WELL 7.7' BG

BOTTOM OF BORING 8.5' BG

HOLE DIAMETER